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USSR Report

SCIENCE AND TECHNOLOGY POLICY

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SCIENCE AND TECHNOLOGY POLICY

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ORGANIZATION, PLANNING AND COORDINATION

FORMULATION, IMPLEMENTATION OF REGIONAL SCIENTIFIC, TECHNICAL PROGRAMS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 8, Aug 84 pp 48-54

[Article by Candidate of Economic Sciences N. Yermoshenko: "Methodological Problems of the Formulation and Implementation of Regional Scientific and Technical Programs"]

[Text] In recent years the goal program approach to the management of the development of science and technology has been used more and more extensively in the practice of socialist management. In the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (1983) its further development is envisaged: regional scientific and technical programs are being introduced in the system of national economic management. "Their objective necessity and importance," First Secretary of the Ukrainian CP Central Committee V. V. Shcherbitskiy indicates, "are governed by the fact that they make it possible in practice to implement the Leninist principle of the sectorial and territorial bases in the management of the national economy and to unite centralized planning with the activity of regional organs of management, which operate on the voluntary basis, and with the broad initiative of production and scientific collectives."[1]

In connection with the effectiveness of the goal program approach during the current five-year plan the formulation and implementation of regional scientific and technical programs (RNTP's) in the Ukrainian SSR have assumed a mass nature: there are about 120 of them, that is, on the average 4-5 per oblast. The analysis of 107 such programs, which was made by the Institute of Industrial Economics of the Ukrainian SSR Academy of Sciences, showed significant methodological shortcomings, which affected the quality of the formulation of the programs themselves and the efficiency of their implementation. With respect to the status of formulation and implementation the programs have the following breakdown: 28 percent--sectorial, 58 percent--intersectorial, 11 percent--oblast, 3 percent--interoblast (within the framework of the regional scientific center). The programs of only 16 oblasts (of the 23 oblasts, the programs of which were analyzed) have a technical and economic substantiation. Such important sections as "The Analysis of the Established Level of the Solution of the Problem" and "The Tree of Goals of the Program" are missing in 87.8 percent of the programs. The goals of practically all the programs do not have quantitatively expressed

characteristics. A system of their control has not been incorporated in the majority of programs (with the exception of the programs of Volyn, Voroshilovgrad and Cherkassy oblasts). The periodicity of the checking of the implementation of the programs--from monthly to annual--also differs significantly. There is no procedural unity in the structure of the programs.

These shortcomings are a consequence of the poor methodological and procedural study of the questions of the formulation of regional programs and the control of their implementation. Some existing official procedural materials are suitable for any regional programs, but do not take into account the peculiarities of scientific and technical programs. Others are suitable for scientific and technical programs, but they do not take into account the specific nature of regional programs.

For the creation of the methodological base of the formulation and implementation of such programs it is expedient to specify first of all the essence of the goal program management of scientific and technical progress, including at the regional level. They are formulated as a version of socialist management and are based on three principles.

The first principle is the principle of systemicity, comprehensiveness. The program can be regarded as a system, which consists of a number of elements and has systems properties, that is, when the result of the functioning of the system is greater than the sum of the results of the functioning of the individual elements which constitute the system. The program should at the same time act as a method of the program planning of scientific and technical progress, a means of the goal program management of scientific and technical progress and a tool of the combination of the sectorial and territorial management of scientific and technical progress. It is possible to regard as manifestations of comprehensiveness in the goal program management of scientific and technical progress at the regional level the integration in the program of the scientific and technical, economic, social, ecological, organizational, psychological, production and legal aspects of the solution of a major regional scientific and technical problem, as well as the intersectorial and interregional nature of the problem being solved through the program.

The goal principle is the second principle of the goal program approach to the management of scientific and technical progress. It presumes the priority formation of the ultimate goal (set of goals) of the solution of one scientific and technical problem or another for a specific period with the subsequent distribution of all types of resources in conformity with the set goal. Here the entire set of tasks and operations on the solution of the scientific and technical problem is subordinate to the achievement of the ultimate goal which was outlined in advance--the increase of production efficiency. However, any goal, including the ultimate goal, should satisfy a number of requirements: specificity, practicability, controllability.[2] The goal "the increase of production efficiency" does not satisfy the first requirement. It is not specific, since it is not expressed quantitatively. Consequently, the goal of increasing production (service) efficiency is liable to specification in each case of the formulation of a program, which is

possible by the formation of a set of goals and their quantitative expression. At the same time this will also make it possible to ensure the realization of the requirement of the controllability of the goal. The practicability of a goal depends first of all on the conditions, under which the program is implemented: the availability of a reserve in the solution of the problem, the available resources and time, which are necessary for this solution.

The third principle is the combination of the sectorial and the territorial aspects. The necessity of such combination stems from the intersectorial and interregional nature of many scientific and technical programs and from the need for the equalization of the scientific and technical level of individual sectors of industry and the national economy and the continuous increase of the scope of the introduction of scientific and technical achievements in production and the service sphere.

The content of the goal program management of scientific and technical progress in a region can be revealed more completely by its basic components, that is, by the cycle "the problem--the goal--the program--the organizational structure of the management of the program." These components constitute the basis of the realization of the technological chain of the goal program management of scientific and technical progress, which presumes the existence of at least the following stages: 1) the choice of the problems which are liable to program solution, 2) the determination of the goals of the program, 3) the formulation of the program, 4) the determination of the organizational structure of the management of the program, 5) the implementation of the program, 6) the evaluation of the results of the implementation of the program. The indicated basic components of the goal program management of scientific and technical progress at the regional level in many ways predetermine not only its technology, but also the composition of the functions. Moreover, it is also advisable to determine its functional structure with allowance made for the set of functions of the management of scientific and technical progress in the region: programming (including forecasting), planning, organization, regulation, stimulation, control (including analysis). With allowance made for both circumstances it is possible to distinguish the following functions in the structure of the goal program management of scientific and technical progress on the regional level: analysis, targeting, programming, organization, stimulation, control and regulation. The implementation of the indicated functions and the formation of the cited components of the goal program management of scientific and technical progress will make it possible to carry out more thoroughly and comprehensively the solution of major regional scientific and technical problems.

At least 65 attributes of the classification of comprehensive goal programs are cited in the literature. Their analysis makes it possible to suggest the following methodological approach: the basic attributes of the classification of all types of programs should be selected subject to the set of their structural components. This will make it possible to ensure great accuracy in the classification of programs and to take into account all the types of programs, which are cited in the literature (see the classification).

Classification of Scientific and Technical Programs

Structure of programs	Attributes of classification of programs	Types of scientific and technical comprehensive goal programs
Goal	degree of finiteness of goal	with ultimate goal, with developing goal
	nature of goal	economic, social, socioeconomic, scientific, technical, scientific and technical, production economic, organizational economic, natural ecological, production technological and so on
	compass of goals	single-goal, multiple-goal
	degree of directionality of goal	directional, directional-forecasting
	degree of definiteness of goal	with quantitatively definite goal, qualitatively definite goal, mixed
Resources	scale of commitment of resources	with sectorial resources, with regional resources, with regional-sectorial resources
Set of measures	nature of measures	with scientific organizational, economic, organizational technical, production, material and technical, legal, social measures and so forth, mixed
Time	duration of implementation	long-term, intermediate-term, short-term
Environment	level of program and scope of its implementation	all-union, intersectorial, sectorial, interrepublic, republic, interregional, regional, intraregional, of production associations, enterprises, organizations
Performers	compass of performers	with performers within the region, with performed outside the region, mixed
	nature of relations between performers	directive, continuous, complex

[Table continued on following page]

Structure of programs	Attributes of classification of programs	Types of scientific and technical comprehensive goal programs
Sequence of implementation	degree of realization of goal	basic research, applied research, experimental design development, introduction in production, dissemination of scientific and technical achievements, mixed
Organizational structure of management	nature of management	on a voluntary basis, economic management, mixed

The cited approach to the classification of programs makes it possible to specify the essence of the regional scientific and technical program as an instructional addressed document, in which the set of assignments and measures, which are aimed at the solution of a major regional scientific and technical problem, is coordinated with respect to time, performers and resources. The use of the proposed attributes of the classification of programs in each specific case of the formulation of regional scientific and technical programs makes it possible to give any of them a complete qualitative characterization and to specify precisely its place in the entire set of scientific and technical goal programs. When determining the specific type of one regional scientific and technical program or another, which has several or all of the above-listed attributes, it is expedient to establish the basic (leading, primary) attribute (characteristic) of the program, which follows from the essence and statement of the basic ultimate goal of the program.

Another type of programs--with a directional-forecasting nature--is also possible. They can be formulated for the solution of especially important problems over a long period (15-20 years and more), for example, the renovation and retooling of industry. In accordance with such programs directive assignments, which are included in the five-year plan of economic and social development, are set for the first 5 years of their implementation. Forecasting values on the basic structural components of the program: the set of goals, a set of measures, resource supply, the time of implementation, are calculated for the remaining period. Every 5 years the programs should be revised with allowance made for the fulfillment of the assignments during the preceding five-year plan and the new demands, while the assignments of the next five-year plan should again be approve by directive and be included in the indicated plan. This procedure of the approval of "floating" directive assignments should be established for the entire term of effect of the program. Such a type of program has presently been adopted in case of the formulation of the regional comprehensive goal program "The Renovation and Retooling of Industry of the Donbass" (within the boundaries of Voroshilovgrad and Donetsk oblasts) for a 20-year period.

The regional scientific and technical program, while having something in common with the territorial plan of scientific and technical progress, at the same time has a number of peculiarities. A major regional scientific and technical problem, which within the plan it is either impossible or inefficient to solve, is solved in the program. In the program there is one basic goal, while the plan is of a multiple-goal nature, that is, has simultaneously many basic goals. The duration of the effect of the plan is 5 years, while the time of the implementation of programs is not strictly linked with such a duration: it can be longer or shorter than a 5-year period. The program is formulated not only according to the territorial-sectorial principle, like the plan, but also according to the attribute of the unity of the scientific and technical problem being solved and the assurance of the completeness of its solution. In the program a special system of its management is incorporated, while the plan is implemented by the existing system of management.

Regional scientific and technical programs are an important tool of the system of the territorial management of scientific and technical progress and at the same time one of the tools of its combination with sectorial management. Moreover, these programs are becoming "an important tool of the goal program management of science and technology at the regional level."3

The formulation and implementation of such programs are aimed first of all at the solution of major regional scientific and technical problems and the increase by means of this of the efficiency of production and service in the region. Such problems for Donetsk Oblast, for example, are: environmental protection and the use of the waste products of industrial production, the extraction of coal from thin gently sloping and steep seams, the decrease of the consumption of metal in metallurgical production, the increase of the volume of production of blanks with the minimum machining allowances. Accordingly, the programs "The Donbass," "Coal," "Metal," and "Machine Building" were formulated and are being implemented for the solution of these problems. In all 126 academic, sectorial scientific research, planning and design and technological institutes and higher educational institutes and 133 enterprises are taking part in the implementation of these programs. In 3 years the total economic impact from the implementation of the programs came to 56.2 million rubles.

Regional scientific and technical programs ensure the close, inseparable connection of science with production within a specific territory, while their implementation shortens substantially the "science--technology--production--consumption" cycle. Significant scientific, technical, economic, social and ecological results are achieved as a result of the implementation of programs in a region. Regional scientific and technical programs, while holding an intermediate place between the long-term regional comprehensive program of scientific and technical progress and the five-year plan of scientific and technical progress, are inseparably connected with them (are based on the former and are included in the latter) and constitute a unified set with them of the tools of the system of the territorial management of scientific and technical progress.

The identification of the regional problems, which are solved through the programs, holds a significant place in the methodology of the formulation and implementation of regional scientific and technical programs. Here it is necessary to develop efficiently an algorithm of the choice of such problems: the careful analysis of the achieved level and the formed trends of the scientific and technical development of the region and the indicators of its efficiency during the base period; the study of the causes of the nonfulfillment of the plans of scientific and technical progress and the economic and social development of the region; the determination of the needs of the national economy of the regions for the acceleration of scientific and technical progress; the recording, analysis and generalization of information on the existence of problem situations in the scientific and technical development of the region; the recording of appearances in the region of some scientific and technical problems or others of an all-union or republic scale; the use of the set of criteria for the purpose of the final choice of the problems for program solution. Moreover, it is advisable to determine the degree of conformity between the individual goals of the scientific and technical development of the national economy of the given region and the existing, as well as anticipated possibilities of their realization. Here one should take into account as fully as possible the prospects of the acceleration of scientific and technical progress and its economic, social and ecological consequences.

The proper specification of the set of criteria of the choice of scientific and technical problems, which are solved through the programs, is becoming an important methodological question of the identification of such problems. Their precisely specified set will make it possible to approach more soundly the choice of the problems, which are solved through regional scientific and technical programs, and to limit the number of programs which are being implemented simultaneously. For example, in Rovno Oblast 13 regional programs (comprehensive goal and sectorial) are being implemented simultaneously. But the lack of sound criteria of choice had the result that four regional comprehensive programs ("The Harvest," "The Food Program," "Sugar," "The Agrocomplex") and six regional sectorial programs ("Beef," "Hog Raising," "Dairy Cattle Breeding," "Vegetable Growing," "Horse Breeding," "Fodder and Feed Protein") pertain to one large problem of the development of the agroindustrial complex--the food problem.

In the literature there is no common opinion in the area of the specification of the set of criteria for the choice of problems which are solved through the programs: at least 73 criteria, which are different in name and essence, are proposed.

Among the criteria of the choice of problems for program solution one should include only the basic, priority attributes. The set of such criteria will constitute the qualitative definiteness for the choice of the problems which are solved through the programs. Wherever possible quantitative definiteness through a set of indicators is necessary for ensuring the comprehensive evaluation of scientific and technical problems.

With allowance made for the analysis of the criteria cited in the literature, as well as our own elaborations, it is possible to assign to the set of

criteria of the choice of regional scientific and technical problems for program solution the following ones: scope (the intersectorial nature of the problem, the solution of which goes beyond the individual sector of the given region); comprehensiveness (the multi-aspectual nature of the problem, the existence of scientific and technical, economic, social, production, organizational, legal, ecological and other aspects of its solution); urgency (novelty, the urgency of the solution of the given problem); the intensity of the problem (the likelihood of the solution of the problem, its backing with scientific and technical reserves and resources); efficiency (the existence of significant scientific and technical, economic, social and ecological results from the solution of the problem and their substantial influence on the development of the region); time necessity (the need for the solution of the problem within a limited time); manageability (the possibility of the simultaneous implementation of a certain number of programs); the impossibility or ineffectiveness of the solution of the given problem within the plan of scientific and technical progress or the plan of the economic and social development of the region, the necessity of a special mechanism of management for this. From the point of view of the possibility of quantitative evaluation the indicated criteria are divided into two groups: 1) those which lend themselves to traditional methods of quantitative expression (scale, comprehensiveness, intensity, efficiency, time necessity, manageability); 2) those which require a descriptive approach (urgency, impossibility of solution within the plan).

The elaboration of a set of requirements, which should be adhered to during their drafting, is an essential methodological aspect of the formulation of scientific and technical progress [as published]. The basic requirements, which pertain to the soundness of the choice of the problem and the effectiveness of its solution, the sequence of the formulation and the structure of programs and their place in the system of planning and management, have already been elaborated in the theory of goal program management. However, these requirements concern any types of comprehensive goal programs. Therefore, these requirements have to be specified with respect to the class of problems in question and, perhaps, new ones have to be elaborated. Thus, it is possible to regard iterativeness--the need for the sequential combination of sectorial and territorial interests in a specific program and the possibilities of solving the given problem in the area of the supply of scientific and technical reserves--as an important demand on the formulation of regional scientific and technical programs.

The materials of the regional comprehensive program of scientific and technical progress (the section "Regional Problems of Scientific and Technical Progress" of the republic comprehensive program of scientific and technical progress) are the main initial base of the formulation of regional scientific and technical programs. For example, the following basic initial data for the formulation of programs of this sort: the set of goals of the scientific, technical and socioeconomic development of the region and individual sectors of its economy for the future; the set of forecasts of the socioeconomic consequences of scientific and technical progress; a list of the problems of a scientific and technical nature, which are to be elaborated; the scientific and technical reserves for their solution; the results of the analysis of the established level of the scientific, technical and socioeconomic development

of the region, are contained in the comprehensive program of scientific and technical progress in industry of the Donbass and in the section "Regional Problems of Scientific and Technical Progress in the Southern Region" of the republic comprehensive program of scientific and technical progress.

The set of goals should be regarded as the framework of the program, which to a significant degree determines both its structure (the composition of the components with their interrelations) and the sequence of the formulation and implementation of the regional scientific and technical program. Here the nature of the ultimate goal itself is determined by the nature of the problem which is being solved through the program. The process of forming the set of goals can include the following stages: the choice of the regional scientific and technical problem which is solved through the program; the elaboration of the concept of its solution; the choice of the initial (basic) goal of the program; the elaboration of the set of goals proper and their quantitative specification in the form of ultimate indicators; the grouping of measures and performers as applied to the subgoals of different levels. The concept of the solution of the regional program develops into a goal (set of goals) with the ripening of the external and internal prerequisites of its implementation (the existence of scientific and technical reserves for the given problem and the corresponding resources). The basic end results of the regional scientific and technical program can be: the expenditures on the implementation of the program (including its formulation), the scientific, technical, economic, social and ecological results, which are expressed by way of the corresponding indicators.

At least 13 different versions of the structure of comprehensive goal programs, which contain 92 components, that is, on the average 7 components in each version, are cited in the literature. Their analysis made it possible to select the necessary structural components of the regional scientific and technical program. It is possible to assign to such components the following sections: the formed level of the problem being solved through the program; the set of goals of the program; the set of measures; resource supply; the composition of the performers; the time of the implementation of the program (by stages, measures and assignments); the environment, place of introduction; the sequence of formulation and implementation; the system of management of the program. Such a structure is standard with respect to those cited in the literature. The content of each of the sections of the program will be determined by the characteristic features of the regional scientific and technical problem being solved through the program. It should be noted that the division of the program into sections is arbitrary, but they are not drawn up in such a form, since they are put together in one document as forms.

When selecting the sequence of the formulation and implementation of regional scientific and technical programs two means are possible: by stages of the "science--technology--production--consumption" cycle and in accordance with the organizational attribute (by stages of the formulation and implementation of the programs). The second means is more effective. In case of it the sequence of the formulation and implementation of the program is determined by its structure, that is, when the set of stages of the formulation and implementation of the program encompasses the elaboration of all the sections of the regional scientific and technical program. Thus, the regional

scientific and technical program "The Protection and Improvement of the Environment" was formulated in Kiev. It includes the development and introduction of waste-free technological processes at chemical works and foundries, the improvement of the purification of water and air, the decrease of the exhaust level and noise from street traffic and the rationalization of the landscaping of the city.

With allowance made for this situation, as well as the made analysis of the stages of the formulation and implementation of programs, which are proposed in the literature, the following stages, which are implemented in sequence or in parallel series, can be standard for regional scientific and technical programs: the choice of the problems being solved through the program; the preparation of the initial assignment on the formulation of the program; the formation of the set of goals of the program; the elaboration of alternate versions; the evaluation and choice of the optimum version of the program; the drawing up of the program as a separate document; the management of the program. Along with this the list of stages, which are necessary for the formulation and implementation of one program or another, is made more precise in each specific case subject to the formed set of goals.

The scope and comprehensiveness of regional scientific and technical programs, as well as the iterative nature of their formulation predetermine the use of computer technology in the process of the formulation and management of programs of this sort. This applies first of all to such functions of the goal program management of scientific and technical progress in the region as targeting, programming, control and regulation. The use of computers for the formulation and management of comprehensive goal programs at the level of the republic is planned within the Ukrainian SSR RASUNT [republic automated system for the control of the development of science and technology]. The integrated nature of the use of information: the one-time feeding of program information into the computer and its repeated use during different periods of the implementation of the program for the needs of any levels of management, is the most important requirement of the use of computers during the formulation and management of the regional scientific and technical program.

The organizational structure of management is predetermined by the essence and the set of characteristics of the program. The management of regional scientific and technical programs has an essential specific nature, to which the experience gained in the Ukrainian SSR attests. This specific nature consists in the establishment and operation of interdepartmental special-purpose scientific production associations and complexes, through which the management of specific regional scientific and technical programs is accomplished; in the management of the program through a coordinating council headed by the secretary of the oblast party committee or the deputy chairman of the oblast soviet executive committee; in the management of the programs by the inclusion of their assignments in the comprehensive plans of scientific, technical and socioeconomic work of the Ukrainian SSR Academy of Sciences with enterprises and organizations of the corresponding region.

The system of the control of the implementation of scientific and technical progress in Voroshilovgrad Oblast, which is carried out by the scientific and technical information center, has given a positive account of itself. This

center controls five regional programs--"The Donbass," "Metal," "Labor," "Coal," "The Decrease of Manual Labor in Construction"--which consist of 46 stages. As a result of the efficiently adjusted system of control in 3 years of the current five-year plan there have been practically no disruptions in the fulfillment of the individual stages of these programs. A special method for managing regional scientific and technical programs was the basis of the efficient organization of control. The processed information is turned over to the coordinating councils for the programs and to the sectorial departments of the oblast party committee, on the basis of which they take the appropriate steps.

In Odessa Oblast the coordinating councils for the programs "Machine Building," "Transport," "The Chemical and Medical Industry," "Labor," "The Agrocomplex" and "The Food Industry" jointly with the scientific and technical information center once every 6 months issue information bulletins, in which the results of the implementation of the program and the basic reasons for the nonfulfillment of individual stages or assignments are cited and the information support for the coming period is specified.

A new form of the management of comprehensive goal programs has taken shape during the current five-year plan--"the tracking of scientific and technical programs" ("vertical" and "horizontal"). The USSR Central Statistical Administration carries out the "vertical tracking" of union programs, while the "horizontal" tracking has been assigned to the existing territorial organs of scientific and technical information. For this additional functions on the tracking of scientific and technical programs of the union level have been assigned to republic institutes and intersectorial centers of scientific and technical information. In this connection, as well as with allowance made for the experience gained by a number of territorial scientific and technical information centers (the Kiev Department of the Ukrainian Scientific Research Institute of Scientific and Technical Information, the Voroshilovgrad and Odessa centers) it makes sense to assign to them the tracking of regional scientific and technical programs.

All this attests to the quite extensive set of functioning organizational structures and methods of management of programs of various kinds. It is obvious that such a choice of one organizational structure or another will depend in many ways on the nature of the program, the formed conditions of its implementation and the traditional forms of management in one region or another. For these purposes it is proposed to draft "a special statute on the management of programs, which would acquire the force of an enforceable enactment."[4]

In order to dwell on one version or another of the organizational structure of the management of a program, it is expedient first of all to elaborate the methodological demands on it and on its formation and functioning. Our own research and the analysis of the literature showed that it is possible to group with the basic ones of them the following: reliability--the dependability of functioning during the entire term of effect of the program; flexibility (efficiency)--the ability to react quickly and comprehensively to deviations from the changing conditions of the fulfillment of the program assignments; the full consideration of the specific nature of the program (the

set of its characteristics)--the scope, the existence of subprograms, comprehensiveness, the territorial isolation of the organizations and enterprises, which are the performers, their established interaction; conformity to the composition of the functions of the goal program management of scientific and technical progress (the organizational structure should implement the entire set of functions of this type of management); the possibility of including the organizational structure in the existing system of the regional management of scientific and technical progress; the existence of the corresponding rights in the area of the implementation of the programs.

When formulating and implementing regional scientific and technical programs the comprehensive evaluation--qualitative and quantitative--of their effectiveness is important. The following advantages of the use of regional scientific and technical programs for the solution of major regional scientific and technical problems constitute the structure of qualitative definiteness: the improvement of the degree of continuity in the planning of scientific and technical progress; the increase of the scientific soundness of the plans of scientific and technical progress as a component of the plans of the economic and social development of regions, in which the regional scientific and technical programs are included structurally; the increase of comprehensiveness in the management of scientific and technical progress at the regional level; the increase of the economic, social and ecological orientation of the solution of problems of scientific and technical progress; the more complete combination of the sectorial and the territorial aspects in the management of scientific and technical progress; the shortening of the time of the solution of regional scientific and technical problems.

The impact from the formulation and implementation of comprehensive goal programs: the direct and systems (program) impact, should be differentiated. The impact from the production and consumption of the final product within the given region (including the impact for the producer of the final product of the program) and the impact from the distribution of the final production of the program in the national economy (beyond the given region) are included in the direct impact. The systems (program) impact is the organizational impact, the impact of the appearance in the program of systems properties, the impact of the special-purpose organization of work on the obtaining of the final product in conformity with the program.

It is very difficult to determine the quantitative importance of the systems (program) impact. Nevertheless it is possible to suggest the following methodological approach. This impact is the difference between the results of the solution of the given regional scientific and technical problem by the formulation and implementation of the comprehensive goal program and through the territorial plan of scientific and technical progress (the plan of the economic and social development of the region). Such an approach is applicable to the quantitative evaluation of all types of the systems (program) impact from the formulation and implementation of regional scientific and technical programs. Further research will make it possible to specify the proposed methodological approach and to bring it up to the procedural level.

The elaborated methodological aspects of the formulation and implementation of regional scientific and technical programs could become a part of the theoretical base for the development of the corresponding procedural principles and their practical use when formulating such programs in the oblasts and regions of the Ukrainian SSR already for the 12th Five-Year Plan. This will also contribute to the assurance in the republic of a uniform approach to the formulation and implementation of regional scientific and technical programs and to the increase by means of this of the efficiency of the goal program management of scientific and technical progress in all regions.

FOOTNOTES

1. IZVESTIYA, 1 October 1983.

2. V. G. Afanas'yev, "Obshchestvo: sistemnost', poznaniye i upravleniye" [Society: Systemicity, Knowledge and Control], Moscow, Politizdat, 1981, p 261.

3. "Nauchno-tekhnicheskiy progress. Programmnyy podkhod" [Scientific and Technical Progress. The Program Approach], Moscow, "Mysl'", 1981, p 162.

4. N. Chumachenko, "The Goal Program Method of Planning and Management in the Ukrainian SSR," EKONOMIKA SOVETSKOY UKRAINY, No 2, 1983, p 20.

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ORGANIZATION, PLANNING AND COORDINATION

COMPREHENSIVE PROGRAMS OF IVANO-FRANKOVSK OBLAST

Kiev PRAVDA UKRAINY in Russian 7 Sep 84 p 3

[Article by I. Postoronko, secretary of the Ivano-Frankovsk Oblast Committee of the Communist Party of the Ukraine: "On the Shoulders of Machines"]

[Text] The remark, which was heard from the rostrum of the Ivano-Frankovsk Oblast Party Conference, that it is necessary to be more concerned about the mechanization and automation of labor, I will not conceal, aroused compound feelings in me. Much is being done in the oblast in this regard. For example, the production of vinyl chloride is controlled from one console. At the new enterprises for the production of caustic soda and chlorine in Kalush the degree of automation is two- to threefold greater than at the works which were built during the 8th and 9th Five-Year Plans.

And the influence of what is broadly called scientific and technical progress is being felt not only in the chemical sector. The new mechanized and automated lines at the Kolomyyasel'mash and Geofizpribor associations and at the Avtolitmash Plant, the arrival in machine building of the Carpathian region of an entire family of robots and manipulators--all this cannot but give pleasure.

But the conference correctly specified the directions of the activity of communists--to deal even more closely and even more objectively with the questions of scientific and technical progress and the introduction of new equipment, to analyze even more scrupulously in what sectors, in what jobs and operations this process is occurring slowly and why. To analyze in order then to take specific effective steps.

We should and can deal with these most important questions not spontaneously, not occasionally, but constantly, purposefully, systematically. There is the council for the promotion of scientific and technical progress, which was set up under the auspices of the oblast party committee and is headed by First Secretary of the Oblast Committee I. A. Lyakhov, there is the Comprehensive Plan of the Development of Scientific Research and the Introduction of the Achievements of Science and Technology in the National Economy of the Oblast for 1981-1985, there is, finally, the Labor Comprehensive Program. They also include a significant number of measures on the automation and mechanization

of production. These documents were approved by a joint decree of the buro of the oblast party committee and the oblast soviet executive committee.

The councils for the promotion of scientific and technical progress. Recently such a council attached to the Ivano-Frankovsk City Party Committee heard a report on the introduction of new equipment at the Avtolitmash Plant. A number of complaints about the management of the plant were expressed. At the same time it was noted that the drafting of the comprehensive plan of the introduction of science and new equipment, the increase of productivity and the improvement of working conditions at this enterprise merits close study and generalization.

Avtolitmash, just as the Karpatpressmash Production Association, is working for technical progress, producing new automated and semi-automated lines for founding and pressing of other enterprises. But it also happens as follows--you supply others, but do not have it yourself, as in the proverb: "a shoemaker without shoes." You would not say this about Avtolitmash. Here Chief Engineer M. V. Gorodyskiy became the soul of the drafting of the comprehensive plan. A quite well-balanced system, which envisages, in addition to the filling of orders for foundry equipment according to the latest word of science and technology, also the use of promising achievements at their own enterprise, as well as the introduction of the scientific organization of labor and production management, has been set up.

In the comprehensive plan each measure is laid out "by shelves." A quite all-embracing, exhaustive picture is the result. If it is a question of the improvement of internal production, here is how this looks on the basis of a specific example. The start-up of the robotized complex in Shop No 14 will provide for the plant as a whole a 0.06-percent increase of labor productivity, will decrease the labor intensiveness by 14,500 standard hours a year, will provide during the same period an economic impact of 12,500 rubles and will decrease the production cost by 53,400 rubles.

I believe that the very plan of where, what and how we save, what we increase and improve and how, and what we decrease or leave without changes, could be useful to many enterprises.

I would not say that there are no interesting finds in other directions as well. For example, at the Karpatpressmash Production Association they undertook to decrease this year the labor intensiveness of a press by 300 standard hours, which is equivalent to the additional production of 80 presses a year and the conditional freeing of 63 workers. The enterprises of the Karpatpressmash and Nefteburmashremont associations are striving to ensure the output of items in conformity with the planned labor intensiveness. The collective of the Prikarpatles Production Association, which is headed by Hero of Socialist Labor V. F. Veres, is well known for fine deeds far beyond the oblast. Owing precisely to retooling the association has approached almost completely waste-free production.

In many cases, however, such quests are perceived as incidents. The influence of the oblast party committee is also needed in order to give them a greater systems nature and to formulate a clear policy. For example, the assignments

on the introduction of robots and manipulators during the current five-year plan were reported to the machine builders of the Carpathian region precisely by a decision of the buro of the oblast committee. Then to execute this decision an affiliate of the Kuzrobot Planning and Design Institute was opened in Ivano-Frankovsk.

For the present the pace of mechanization and automation in machine building, construction, just as at enterprises of the construction materials industry, in the food and light industries, transport and a number of auxiliary operations, including loading and unloading operations, does not satisfy us.

Recently at a meeting of the council for the promotion of scientific and technical progress N. V. Ilyk, chairman of the Kosovskiy Rayon Soviet Executive Committee, and I. V. Soltan, general director of the oblast Prikarpatstroymaterialy Association, reported on the progress of the fulfillment of the Labor Comprehensive Goal Program. The Kosovskiy Rayon workers had fulfilled their assignment on the changeover of workers of the enterprises of the rayon from manual to mechanized labor by only 48 percent. I believe that the discussion will do good.

The communists of the Carpathian region remembered well the words of Comrade K. U. Chernenko, which were said at a meeting with the workers of the Serp i molot Plant: "At the present stage the retooling of sectors and the introduction of the latest achievements of science and advanced know-how are acquiring particular importance." We are guided by them in accomplishing the tasks of this year. And the tasks are such: to mechanize and automate 85 shops and sections, to produce 63 mechanized and automatic flow lines, to assimilate 242 new technological processes, to change 8,500 people over from manual to mechanized labor. Some 40 million rubles--we intend to obtain such an amount of savings during the year just as a result of technical innovations. And, of course, we are adopting the know-how of the Dnepropetrovsk combine builders in the certification and rationalization of every workplace, which was endorsed by the Ukrainian CP Central Committee.

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ORGANIZATION, PLANNING AND COORDINATION

PROBLEMS OF TOOL PRODUCTION, SUPPLY, QUALITY, RELIABILITY

Tallinn SOVETSKAYA ESTONIYA in Russian 4 Oct 84 p 2

[Article by B. Levin, Chairman of the Problem Committee of Tool Production of the Estonian Republic Council of Scientific and Technical Societies: "Reliability and Quality for Tools"]

[Text] The efficiency of the work of every enterprise in many ways depends on how it is supplied with modern tools and machine tool accessories. However, the funded deliveries are not meeting the needs. Therefore a portion of the standard tools, as well as all the specialized tools, and machine tool accessories are produced, as a rule, in small shops at every metalworking enterprise very nearly by a primitive method.

The Estmashsnabsbyt Administration supplies the industrial enterprises of the republic with tools. It keeps track of the correctness of their use, storage and writing off. But a special organization, which would assume the introduction of new tools, does not exist in the republic. The Problem Committee of Tool Production of the Estonian Republic Council of Scientific and Technical Societies performs this function as a voluntary service. It has existed for nearly 15 years now and unites in its ranks representatives of a number of sectors of industry--machine building, instrument making, ship repair and others.

The committee regularly holds seminars and conferences and organizes schools of advanced know-how. The scientific research institute of the TEZ imeni M. I. Kalinina Association, the All-Union Scientific Research Institute of Tools and the All-Union Scientific Research Institute of Diamond Tools and Processing of Diamond Machines, as well as Lvov Polytechnical Institute are giving the committee much assistance. Thus, with the aid of the last one in 1982 a polymer-containing lubricant-coolant was successfully tested at the TEZ imeni M. I. Kalinina Association. Its use makes it possible to decrease sharply the consumption of cutting tools, especially in case of the machining of stainless steels, and to improve the quality of the machining of surfaces and the condition of the machine tools themselves. Hence, it also makes sense to use this fluid at other enterprises of the republic. Our committee displayed initiative and reached an agreement on deliveries of the lubricant-coolant for 1984 and 1985 directly with the developers--Lvov Polytechnical

Institute and the manufacturing plant. As a result a number of plants of the republic have already received this lubricant-coolant.

In recent years the committee made a survey of the tool service at many enterprises. What did this survey show?

Almost nowhere is there a service for the technical supervision of the correctness of the use to tools. This leads to their excessive consumption and, hence, to mismanagement. The following circumstance was also established. At machine building enterprises, as a rule, every gram of hard alloys is used economically, their scraps are collected and turned over. But at the machinery and repair plant of the Estonslanets Association in this respect they live more than carefree: more than 25 tons of hard alloys are used a year for the production and repair of drill bits (the fund of all the other enterprises of the republic is 40 tons). Such inordinately high consumption in part is due to the use of an obsolete technology of the brazing of hard-alloy inserts in position and the sharpening of bits. The committee of tool production decided to help--it organized at the plant the exchange of advanced know-how, assistance was given to the enterprise in the setting up of a modern technology of the brazing and sharpening of drill bits. I would like to emphasize, however, that the production workers themselves up to now have displayed little initiative in this respect.

At all the checked plants--the Vol'ta Plant, the Machine Building Plant imeni I. Lauristin, the Tartu Instrument Making Plant, the Baltic Estremrybflot Ship Repair Association and others--the following fact was also established. The central tool storehouse, as a rule, is empty. At the same time in the shop storerooms the shelves are breaking under the weight of tools. What is the reason here? The fact is that a stock of tools, which exceeds their consumption in 3 months, should not been stored at the central storehouse. For this reason they hasten to write them off a little more quickly from the balance sheet of the plant, while in the side table of the lathe operator or milling machine operator it is possible to find his own "store" with a 2-year and greater stock of tools. And they are not registered anywhere--such is the system of their issuing and writing off. For example, there are no tungsten-containing bars in the central storehouse, there are almost none of them in the tool-distributing storeroom. But nevertheless the workers have them in significant quantities--written off, reliably put away "for a rainy day." And it is this way not at one plant, but at nearly all the ones which were checked. The basic causes of such an abnormal situation lie in the system of the issuing of funds. Indeed: Will the repair and machinery plant, which was being discussed, achieve a decrease of the consumption of hard alloys, if the saving might entail a decrease of the funds being issued? And what if irregularities with deliveries of solder, flux and diamond wheels suddenly occur? What is to be done then?

Therefore one also has occasion to hear pretty often the expression "reserves do not beg to eat." But meanwhile it is necessary to remember that tools, first of all hard alloys, with time become obsolete and cease to meet the requirements of technical progress. It is necessary to use them precisely today, for tomorrow new brands of alloys will appear. And not to make

excessive reserves "for a rainy day." This in the end turns into significant losses.

In spite of the above-standard surpluses of tools at the majority of enterprises, many of them are experiencing a shortage (or the complete absence) of some specific type of them. Why? As has already been noted, we do not have an adequate number of narrowly specialized tool plants, while tools of tens of thousands of type sizes are needed for meeting the needs of industry. What is one to do, if the necessary type is not available at either the enterprise or at the central storehouse of the territorial administration? In such cases a "neighbor" usually gives a hand. However, the written permission of Estmashsnabsbyt is necessary for the transfer of tools, otherwise the release is considered illegal. It is clear that this causes additional troubles. Such permission is not issued at all to the enterprises of the State Committee for the Supply of Production Equipment for Agriculture and several others, which do not receive tools through the territorial administration. These interdepartmental barriers lead to a kind of barter: "You give me a tap borer, I give you a threading die." It is necessary to seek a way out of the situation! But about 10 years ago the manager of the enterprise had the right to release tools to whoever urgently needed them, without a middle man--the territorial administration. And the transfer of tools from one enterprise to another could be carried out regardless of their departmental affiliation. Thus, perhaps this right of the manager should be restored?

At the small repair enterprises of the State Committee for the Supply of Production Equipment for Agriculture, especially in remote regions, at times they use any tools which are easily available, without taking into account for what they are intended. The reason is that the system of centralized supply simply does not work. Therefore "messengers," who "acquire" any tools suitable for metalworking, are sent to the city to machine building plants. Of course, this is illegal and improper. But what is the solution, if centralized deliveries do not meet the needs of agricultural enterprises? Obviously, in such a case unfunded deliveries are also needed. The State Committee for Material and Technical Supply could assume the initiative--could expand small-scale wholesale trade in tools at its base and periodically hold trade fairs, at which above-standard or illiquid tools would find a demand without fail.

The survey of tool shops gives a quite alarming picture. Their capacities are not increasing, the equipment is aging with each year, the shift coefficient is very low. Moreover, the managers of some enterprises at times load their tool shops with the output of basic products. A short-sighted policy! For this in the end will adversely affect the production process.

There are, to be sure, many difficulties in the supply of industrial enterprises with tools. But one thing is clear: it is possible and necessary to develop tool production and to use machine tool accessories more efficiently. Moreover, it is necessary to devote the basic attention to the introduction of advanced productive tools.

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ORGANIZATION, PLANNING AND COORDINATION

KAZAKH GOAL PROGRAMS OF SCIENTIFIC, TECHNICAL PROGRESS

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 9, Sep 84 pp 44-50

[Article by Deputy Chairman of the Kazakh SSR State Planning Committee K. Dashkov: "The Comprehensive Plan of Scientific and Technical Progress"]

[Text] One of the strategic directions of party economic policy is to unite the advantages of our social system with the achievements of the scientific and technical revolution. At the 26th CPSU Congress it was noted that the conditions, under which the national economy will develop in the 1930's, are making the acceleration of scientific and technical progress even more necessary [as published]. The key questions of the accomplishment of this task were examined at all the subsequent CPSU Central Committee plenums and found worthy reflection in the decisions of the party and government. General Secretary of the CPSU Central Committee Comrade Konstantin Ustinovich Chernenko focused the attention of the participants in the February (1984) CPSU Central Committee Plenum on this. He stressed that "intensification, the rapid introduction in production of the achievements of science and technology and the implementation of major comprehensive programs" are the basis of the development of our economy.

An effective tool of the management of the economy is the goal program method of planning. In our country it received extensive dissemination in connection with the achievement of a high level of the development of productive forces and production relations, the socialization and concentration of production, the branched structure and complexity of economic ties and with the increasing influence of science and technology on all aspects of social life.

In itself this method is not something completely new in the economy of our country. The plan of the State Commission for the Electrification of Russia, which was drafted on the initiative and with the personal participation of V. I. Lenin during the first years of Soviet power, is its prototype. Now it has received comprehensive theoretical and practical elaboration.

The most important provisions of the goal program method of planning are presented in the decree of the USSR State Planning Committee "On the Basic Procedural Provisions on the Elaboration of Comprehensive Goal Programs," which was adopted in June 1980. In it a definition of these programs (comprehensive goal programs), their peculiarities, types, levels and general

indicators is given, the procedure of elaboration and formation is established. Each of them is a directive address program, which is a complete set of socioeconomic, production, scientific research, economic organizational and other assignments and measures, which are aimed at the effective accomplishment of a national economic problem, the solution of which requires the participation of a number of USSR ministries and departments, councils of ministers of union republics and local organs of management.

The goal program method (PTsM) does not come into conflict with the territorial and sectorial methods, but is their natural development and supplement, which makes it possible to improve the planned economy most efficiently. It is suitable for planning both on the scale of the country and at the sectorial and subsectorial levels, on the scale of the individual enterprise, as well as in case of the elaboration of individual problems. In these cases the goals are set by the corresponding management organs of these levels.

The peculiarities of the goal program method are its goal orientation, the continuous nature of planning and an orientation toward the final product. Since several different means of achieving each goal exist, in case of goal program planning several alternate versions of the program are drawn up, then the best one of them is chosen. The criteria of the choice of the best version can be different, for example, the achievement of the goal in the set time with the least expenditures of resources or the achievement of the goal with a set consumption of a resource in the minimum time; the well-known criterion "efficiency-expenditures" can also be used.

In case of goal program planning the entire life cycle of the items included in the program, which consists of stages: scientific research work, experimental design development, production, capital construction, the placement of projects into operation, is taken into account.

In the system of planning the importance of the formulation of comprehensive long-term programs of an intersectorial nature and their coordination in the system of plans is increasing. Owing to the comprehensive nature of socialist production, the increase of its scale and the development of computer technology the conditions for this coordination have improved. This makes it possible to calculate more accurately and in more detail in a centralized manner both the needs and the means of their meeting.

No less urgent is the use of the goal program method when accomplishing the tasks of intermediate-term planning, which is oriented toward a 5- and 10-year period, when in forming the draft of the basic directions the concept of the program is elaborated, a systems description of its components is given and a comprehensive draft and its preliminary resource substantiation are elaborated. The bulk of the program elaborations are carried out during the drawing up of the five-year plan and are coordinated with the resource indicators and balance sheet calculations, with the overall set of indicators of the sectorial and territorial sections of the plan and with the consolidated reserve of the plan. The dates of the work of the coperformers and of the implementation of individual stages of the program are coordinated. When compiling the annual plans the further detailing of the program

assignments is carried out. Specific interconnected assignments are given to ministries and organs of material and technical supply.

Goal program planning acquired great momentum in 1979 in connection with the publication of the decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality."

The decree established that the drawing up of the long-range plans of the economic and social development of the country should begin with the drafting of a comprehensive program of scientific and technical progress for 20 years, with allowance made for which the drafts of the basic directions of USSR economic and social development for 10 years and, on their basis, the five-year plans are drawn up.

Experience in the formulation of such plans already exists. The USSR Academy of Sciences and the State Committee for Science and Technology jointly with USSR ministries and departments in 1979 formulated "The Comprehensive Program of Scientific and Technical Progress and Its Economic Consequences for the Future to 2005," and now are working on a program to 2010. The first program was drawn up in 27 directions (16 on scientific and technical problems and 11 on socioeconomic problems). The elaboration was carried out by commissions of the USSR Academy of Sciences and the State Committee for Science and Technology under the supervision of a specially created council. About 2,000 scientists and specialists from more than 500 scientific research institutes, design bureaus, enterprises and planning organizations took part in this work.

In conformity with the comprehensive program long-term scientific and technical programs, which are approved the USSR State Planning Committee, the State Committee for Science and Technology, the Academy of Sciences and, for matters of construction, also the State Committee for Construction Affairs, are formulated on the most important problems.

During the 10th Five-Year Plan 200 all-union scientific and technical programs were implemented, and scientific research institutes, enterprises and organizations of the Kazakh SSR took part in 49. For the 10th Five-Year Plan 50 programs on scientific and technical problems of republic and sectorial importance were approved by ministries and departments of the Kazakh SSR, including 18 by the Kazakh SSR Academy of Sciences, 8 by the Ministry of Geology and 5 by the republic Ministry of Nonferrous Metallurgy.

As the practical results showed, the goal program method makes it possible to set in the plans broader, more long-range tasks--not only on the introduction of some technology or other, but also on the retooling of entire sectors of the national economy. Thus, back in 1977 the Kazakh SSR State Planning Committee jointly with ministries and departments drew up long-range plans of the technical development of sectors of republic subordination, which were approved by the Kazakh SSR Council of Ministers. They served as the basis for the annual plans of the introduction of the achievements of science and technology in the national economy.

The implementation of scientific and technical programs is having a substantial influence on the increase of the efficiency of social production. Thus, during the 10th Five-Year Plan by means of the increase of the technical level of production and the introduction of new equipment and technology in the national economy of the republic labor expenditures were reduced by more than 170,000 people, production costs were reduced by up to 400 million rubles. Goal program planning began to be used especially widely during the 11th Five-Year Plan as an effective measure for the implementation of the decree of the party and government on the improvement of the economic mechanism.

In May 1980 the Collegium of the Kazakh SSR State Planning Committee approved a list of the most important economic and scientific and technical comprehensive goal programs which are to be formulated in the future. It included 31 programs, include 12 which are to be implemented during the current five-year plan. They are aimed at the solution of the problem of the complete use of mineral raw materials, the improvement of grain growing and sheep breeding, the development of rail and motor transport, the decrease of manual labor and so on.

For each problem detailed substantiations were made, the basic tasks, the performers and the dates of the fulfillment of the work were formulated. Many problems, which require decisions of union organs, found reflection in the all-union and sectorial programs.

The measures envisaged in the programs of republic and sectorial importance were included directly in the plan of the economic and social development of the republic and in the plans of ministries and departments for 1981-1985. And they are having an effective influence on the increase of the efficiency of social production. Thus, the State Planning Committee and the State Committee for Labor jointly with republic ministries and departments formulated programs of the decrease of manual labor in industry, construction, transportation and the nonproduction sphere, which encompasses enterprises and organizations of republic subordination. In accordance with it it is envisaged to mechanize the labor of 19,700 people and to decrease the product cost by 50.3 million rubles. With allowance made for the measures on union republic enterprises and organizations during 1981-1985 it is planned to transfer 114,000 people from manual to mechanized labor.

In all by means of the implementation of the programs and the plans of the introduction of the achievements of science and technology during the 11th Five-Year Plan in the national economy of the republic it is envisaged to provide a reduction of the labor expenditures of 140,000 people and a decrease of the expenditures on production and marketing by 400 million rubles.

As is known, the USSR State Planning Committee, the State Committee for Science and Technology and the USSR Academy of Sciences approved for 1981-1985 170 all-union comprehensive goal programs and programs on the solution of the most important scientific and technical problems. Scientific institutions, enterprises and organizations, which are located on the territory of the Kazakh SSR, are taking part in the implementation of 104 programs. Many

enterprises and organizations are also taking part in the implementation of sectorial and republic programs.

It should be acknowledged that the existence of such a large number of outlined programs is complicating planning and the monitoring of their implementation. It has been calculated that just the scientific research institutes, enterprises and organizations, which are subordinate to the Kazakh SSR Council of Ministers, are realizing 92 all-union, republic and sectorial programs.

In accordance with prevailing procedure all the measures, which have been included in the all-union and republic programs, should be included in the plans of the economic and social development of the Kazakh SSR in the form of specific assignments for ministries and departments. These assignments should first of all be backed with financing and all other resources.

The USSR State Planning Committee, the State Committee for Science and Technology and party and public organs carry out the monitoring of the implementation of all-union programs. The USSR State Committee for Science and Technology has also entrusted such monitoring to its numerous organs of scientific and technical information, which inform it quarterly on the arising disruptions in the meeting of the deadlines of the outlined work. Under these conditions great responsibility and a great load rest on planning organs, and particularly the Kazakh SSR State Planning Committee. Especially as the implementation of some programs requires much capital and critical resources.

The multitude of programs and the limitedness of resources, especially capital investments, and the still inadequate development of the construction base are causing the need for the choice of priorities, which is possible only in case of the comparison of the expediency of various programs and the estimation of the available resources. Such an estimation is made by the State Planning Committee during the elaboration of the long-range plans of the development and distribution of the productive forces of the republic on the basis of the achievements of scientific and technical progress. At present in our country such a plan has been drawn up for the period to 2000. It has been approved by the USSR State Planning Committee and is being used for substantiating the long-range plans of the development of the national economy of the Kazakh SSR.

The specific questions of the assurance of scientific and technical progress found extensive reflection in "The Comprehensive Program of Scientific and Technical Progress of the Kazakh SSR for 1986-2005," which was drawn up by the Kazakh SSR Academy of Sciences with the enlistment of ministries and departments of the republic and a wide range of scientific research organizations. This 20-year program has a breakdown by 5-year periods.

Several programs, which were envisaged in those mentioned in the plan and the comprehensive program, also found reflection in the State Plan of the Economic and Social Development of the Republic for 1981-1985. At present the scientific institutions of the Kazakh SSR Academy of Sciences are taking part in the implementation of 35 all-union and 8 republic programs on the problems of the study of natural resources, the extraction and processing of mineral raw materials, the chemicalization of the national economy, instrument making,

seismology, nature conservation, the solution of agricultural problems and a number of others.

The Institute of Metallurgy and Ore Dressing of the Kazakh SSR Academy of Sciences, for example, in accordance with the all-union program "Develop and Assimilate Processes and Equipment of the Complete Processing of Ores and Concentrates of Nonferrous Metals" has carried out a number of effective developments. They are a continuation of the work of scientists, which was commended during the past five-year plan by USSR State Prizes.

The Institute of Organic Catalysis and Electrochemistry of the Kazakh SSR Academy of Sciences in accordance with the program "The Development and Assimilation of the Production of New Highly Efficient Low-Temperature Catalysts, the Updating and Enlargement of Their Assortment" developed a number of highly efficient catalysts. The Institute of Chemical Sciences also issued valuable recommendations on the improvement of the production and the assimilation of the output of new effective fertilizers at enterprises of the Soyuzfosfor Production Association.

The scientific institutions of the Eastern Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin are carrying out developments in accordance with 16 all-union and 27 sectorial programs. During the current five-year plan they have developed and turned over for state strain testing 25 new strains of agricultural crops and have bred 8 lines of fine-wooled sheep, the progeny of which in productivity exceed the control lines by 20-25 percent in the wool yield and by 12-15 percent in live weight.

The ministries of the republic are participating extensively in the scientific and technical programs. Thus, the Ministry of Nonferrous Metallurgy is performing work in accordance with 13 all-union and sectorial programs, including on the development and assimilation of autogenous processes at the Balkhash Mining and Metallurgical Combine and the Ust-Kamenogorsk Lead and Zinc Combine. These processes are very economically, since here the sulfur of the concentrates being processed is used as a fuel. The construction of pilot industrial plants is being carried out at both enterprises.

The measures of the comprehensive program of scientific and technical progress and of specific goal and scientific and technical programs are being implemented in the republic in accordance with the plans of economic and social development, as well as in accordance with the plans of ministries, departments and enterprises. In conformity with them over 20,000 measures on the introduction of new equipment and technology are annually implemented in Kazakhstan. In 3 years 498 mechanized flow, completely mechanized and automatic lines for the production, packaging and packing of products have been installed in the sectors which are subordinate to the Kazakh SSR Council of Ministers. Complete mechanization has been carried out in 512 shops, sections and large works, the output of more than 500 new types of industrial products, including 103 types for the first time in the USSR, has been assimilated and started. The production of products of the highest quality category increased from 11.1 percent in 1980 to 12.8 percent of the total volume of commodity (gross) output.

Significant results in the acceleration of scientific and technical progress have been achieved in each of the sectors of the national economy.

In power engineering 7 500,000-kW blocks were put into operation at the Ekibastuzskaya GRES-1. This year about 900 km of the Ekibastuz-Urals 1,150-kV AC electric power transmission line will be put into operation, the construction of the Ekibastuz-Center 1,500-kV DC electric power transmission line will be started.

In ferrous metallurgy the retooling and renovation of enterprises were continued. A large amount of obsolete equipment was replaced at the Sokolovsko-Sarbayskiy Mining and Ore Dressing Combine and the Atasu Mining Administration. A tin plate shop--one of the largest in the country--was put into operation at the Karaganda Metallurgical Combine. New capacities were put into operation at the Yermak Ferroalloy Plant, the furnaces at the Aktyubinsk Plant of Ferroalloys are being overhauled.

In nonferrous metallurgy steps were taken on the elimination of the lag in the development of the raw material base. New capacities for the mining of ores, which are furnished with advanced equipment and technology, were put into operation at the Dzhezkazgan, Achisay, Zyryanovsk, Belogorskiy and Karagayly combines, the Krasnooktyabrskiy Bauxite Mine and a number of works at metallurgical plants. The use of advanced processing methods and computer technology was expanded. The level of the mechanization of labor came to 52.1 percent, the proportion of products of the highest quality category came to 37.4 percent.

Coal production in the republic increased in 1983 by 7.2 million tons. This was achieved mainly by the development and the supply with highly productive equipment of the Ekibastuz open pits. At the Bogatyr' open pit, the largest in the world, 52.94 million tons of coal were mined with a rated capacity of 50 million tons. In all 81.1 million tons were mined this year by the most efficient open-cut method (in 1980 71.6 million tons). The retooling of the mines of the Karaganda basin was completed.

The production of petroleum and gas condensate increased from 18.6 to 19.5 million tons mainly by the development of new deposits and the introduction of the achievements of science and technology on the increase of the petroleum recovery of beds at previously developed deposits.

Especially much was done in the chemical and petroleum refining industry, in which new capacities for the production of phosphorus, industrial rubber items, chemical fibers, styrene and polystyrene and tires and for petroleum refining were put into operation. The 1,642-km Pavlodar-Chimkent petroleum pipeline and the Petropavlovsk-Kokchetav petroleum products pipeline, which are furnished with modern equipment and technology, were built. The production of mineral fertilizers during this period increased from 1,262,000 to 1,342,300 tons (in terms of 100-percent nutrients), the production of synthetic resins and plastics increased from 38,200 to 117,200 tons.

The enterprises of machine building assimilated the production of about 400 new types of machines, equipment and instruments. The output of tractors,

agricultural machinery and spare parts for them, metal-cutting machine tools, instruments and automation equipment increased.

Appreciable results were also obtained in light industry, in which in 1983 alone by means of retooling an increase of production capacities was ensured: for knit outerwear by 500,000 units, for knit underwear by 1 million units, hosiery and socks by 500,000 pair, leather footwear by 250,000 pair and garments by 1.2 million rubles. During the current five-year plan at the enterprises of the republic Ministry of Light Industry the production of fabrics, garments, leather footwear and other consumer goods has increased mainly due to the introduction of new equipment and technology. The output of products with the Emblem of Quality in 3 years increased from 9.3 to 12 percent, and with the index "N" from 4.3 to 8.5 percent.

Much attention was devoted to the increase of the technical level of the agroindustrial complex, the material base of the Food Program. Sovkhozes, kolkhozes and the enterprises, which process agricultural raw materials, received a large amount of new highly productive equipment, advanced processing methods were introduced extensively at them. In 1983 crop rotations were assimilated on an area of 23.3 million hectares, the anti-erosion tilling of soils was used on 21.7 million hectares (97 percent of the lands in danger of erosion). The amounts of fertilized areas increased from 8.8 to 13.1 million hectares. The cultivation of industrial crops in accordance with industrial technology, in accordance with which in 1983 corn was grown on 58,200 hectares (in 1980 on 15,700 hectares), sugar beets--on 13,000 hectares, sunflowers--on 16,000 hectares and tobacco--on 600 hectares, was expanded. The mechanization of operations in animal husbandry increased, the productivity of livestock and poultry increased.

At the enterprises, which process agricultural raw materials, in 3 years the output of the most important types of products increased: meat (including byproducts of category I) from 607,800 to 675,800 tons, whole milk products in terms of milk from 1,104,700 to 1,174,000 tons, animal oil from 60,000 to 61,400 tons, vegetable oil from 83,700 to 86,100 tons, canned goods from 411.4 to 423.9 million conventional cans and confectionary items from 201,900 to 217,100 tons.

Appreciable technical progress was achieved in construction. The proportion of the completely prefabricated construction of buildings and structures increased from 31.4 to 54.3 percent. The placement into operation of large-panel apartment houses in accordance with the standard plans of new series in 1983 came to 53.6 percent as against 34 percent in 1980.

The economic impact from the introduction of new equipment and technology in the national economy of the republic in 1981-1983 came to 145.6 million rubles. But this contribution could have been considerably more significant.

The nonfulfillment of the assignments of the state plans of economic and social development on science and technology is the basic shortcoming in the implementation of the program of the assurance of scientific and technical progress in the national economy of the republic. Thus, in 1983 for the republic as a whole these assignments were fulfilled by only 87.2 percent,

including for the Ministry of Power and Electrification--by 87.5 percent, the Ministry of Nonferrous Metallurgy--by 92.0 percent, the Ministry of the Construction Materials Industry--by 82.6 percent, the Ministry of the Fruit and Vegetable Industry--by 83.3 percent, the Ministry of the Meat and Dairy Industry--by 81.3 percent. These and a number of other ministries during the current five-year plan have not coped with a single annual plan of the introduction of new equipment and technology.

The slow pace of the implementation of the program of the decrease of manual labor is also adversely affecting production. Along with active work on this program in the Ministry of Power and Electrification, the Ministry of Nonferrous Metallurgy, the Ministry of Light Industry and the enterprises of Dzhezkazgan, Kustanay, Pavlodar, Tselinograd and other oblasts, many ministries and departments of the republic for the present are dealing inefficiently with the solution of the important problem. As a result 36.1 percent of the workers in republic industry are still working without the use of machinery, by hand. There is especially much manual labor at the enterprises of the Ministry of the Meat and Dairy Industry (46.5 percent), the Ministry of the Fruit and Vegetable Industry (60 percent) and the Ministry of Construction of Heavy Industry Enterprises (52.8 percent).

The effectiveness of the measures on scientific and technical progress is decreasing due to the unsatisfactory use of the received new equipment at industrial enterprises, construction organizations, sovkhozes and kolkhozes. On 1 July 1983 5,600 mechanized and automated lines for the production of products were installed in industry. However, as the survey showed, a third of them operated not more than one shift a day, including 67 percent of the lines at enterprises of the Ministry of the Meat and Dairy Industry and 75 percent of the lines at enterprises of the Ministry of the Food Industry. In all 1,880 mechanized (45 percent) and 309 automatic lines (62 percent) of those installed in the republic before 1982 have not achieved the rated productivity.

The complete use of the iron ores of the Lisakovskiy and Sokolovsko-Sarbayskiy deposits and of the mineral components of the Ekibastuz coal deposit and the increase of the efficiency of the use of the phosphorites of Karatau are being checked not only due to the limitedness of capital investments. The scientific analysis of these most important scientific and technical problems, especially at the stage of consolidated and pilot industrial tests, is still inadequate. Industrial enterprises, sectorial scientific research institutes and even the scientific institutions of the Kazakh SSR Academy of Sciences still do not have the necessary experimental base. Of the 28 planned experimental bases and pilot works, which should have been put into operation in 1978-1983, only half have been set up.

The planning of scientific and technical progress also needs improvement. Individual departments are including in the plans on the development of science and technology minor measures which poorly influence the increase of the production efficiency of the sectors. Individual enterprises of the Ministry of the Meat and Dairy Industry, the Ministry of the Fruit and Vegetable Industry, the Ministry of the Fish Industry, the Ministry of the Forestry Industry and the Ministry of Consumer Services of the republic do not

even have plans of the introduction of new equipment and the mechanization and automation of production.

Addressing the solemn meeting, which was devoted to the presentation of the Order of Lenin to the city of Alma-Ata, Member of the Politburo of the CPSU Central Committee and First Secretary of the Kazakh CP Central Committee Comrade D. A. Kunayev noted that among the decisive factors of the implementation of the decisions of the 26th party congress and the subsequent CPSU Central Committee plenums a special role belongs to the acceleration of scientific and technical progress.

In the decree of the Kazakh CP Central Committee and the republic government, which is aimed at the implementation of the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (1983), an entire set of organizational measures on the improvement of the planning of scientific and technical progress and the strengthening of the contact of science with production is envisaged. The basic directions of scientific and technical progress in the sectors of the national economy of the republic to 1990 are formulated, the list of the most important scientific and technical programs for the distant future, which are to be formulated in 1984-1985, is specified.

Included in this list are: the Comprehensive Program of Scientific and Technical Progress of the Kazakh SSR for the Period to 2010, the programs of the decrease of manual labor in the national economy, the complete use of mineral resources, the development of solonets lands and others.

The implementation of this decree should become the basis of the activity of ministries, departments, enterprises and organizations of the republic on the acceleration of scientific and technical progress and the increase of the efficiency of social production.

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ORGANIZATION, PLANNING AND COORDINATION

SCIENTIFIC PRODUCTION ASSOCIATIONS OF INDUSTRY

Means of Development

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[Article by Doctor of Economic Sciences Professor S. Pokropivnyy, Candidate of Economic Sciences G. Nebesnyy and A. Savchenko: "The Means of Developing Scientific Production Associations"]

[Text] The utmost intensification of the economy and the steady increase of the productivity of national labor in all its sectors require the further acceleration and increase of the efficiency of scientific, technical and organizational progress and the rapid and extensive introduction in production of the latest achievements of science and technology. Experience shows that the implementation of innovations in the practice of the functioning of scientific, technical and production systems of different levels is a very complex process, especially if it is a question of scientific research institutes, design bureaus and scientific production associations. For the effective control of this process it is necessary, first, to adapt technical, organizational and economic innovations to fit the specific conditions of management in one unit or another of industry and, second, along with the introduction of new principles, forms and methods of scientific and technical activity, to resolutely eliminate the existing shortcomings. The indicated features are especially urgent for the scientific production association as the leading form of the integration of sectorial science and production.

At present more than 250 scientific production associations exist in machine building and other sectors of industry. Moreover, whereas in the 1970's their intensive quantitative increase was observed, in the early 1980's the process slowed substantially. In a number of sectors of machine building the setting up of new associations is balanced with the dissolution of ones which were set up earlier. As a whole the indicated processes should be considered positive, since the dynamism of the development of new directions of science and technology is their objective basis. However, the formed state of affairs also attests that a specific stage of the formation and development of scientific production associations, which can be characterized as the initial and an ambiguous stage according to the dynamics of the basic indicators of the efficiency of their functioning, has ended.

Table 1

Dynamics of the Indicators of the Duration of Developments and the Economic Impact for a Group of Scientific Production Associations in 1975-1982*

Name of scientific production association	Average duration of developments, Years					1982 as a percent of 1975
	1975	1976	1978	1980	1982	
Analitpribor (Kiev)	3.7	2.8	3.5	2.8	2.7	73.0
Analitpribor (Tbilisi)	3.0	2.6	2.6	2.8	3.0	100.0
Impul's (Severodonetsk)	2.5	2.5	2.6	2.2	2.5	100.0
Mikroprovod (Kishinev)	3.0	2.0	2.3	2.2	2.9	96.7
Spektr (Moscow)	3.4	3.3	3.3	3.2	3.1	91.2
Temp (Moscow)	1.9	1.8	1.9	1.9	2.5	131.6
Termopribor (Lvov)	3.8	3.7	3.5	3.1	3.1**	81.6
Elva (Tbilisi)	2.2	1.6	2.0	2.6	2.1	95.5
Average for group of scientific production associations	3.2	2.7	2.8	2.7	2.9	90.6

Name of scientific production association	Annual economic impact per ruble of expenditures (rubles), Years					1982 as a percent of 1975
	1975	1976	1978	1980	1982	
Analitpribor (Kiev)	0.8	1.0	1.2	1.8	1.9	237.5
Analitpribor (Tbilisi)	4.5	2.9	5.1	7.4	4.8	106.7
Impul's (Severodonetsk)	7.0	8.0	12.4	19.0	24.5	350.0
Mikroprovod (Kishinev)	2.7	2.0	2.3	1.7	2.5	92.6
Spektr (Moscow)	2.5	3.2	4.5	2.8	2.8	112.0
Temp (Moscow)	3.1	1.8	2.3	1.8	1.7	54.8
Termopribor (Lvov)	0.3	0.1	0.6	1.7	0.3**	100.0
Elva (Tbilisi)	0.5	0.4	0.3	1.4	1.9	380.0
Average for group of scientific production associations	2.6	3.0	4.1	5.3	6.3	240.0

*Calculated according to the data of the analysis of a group of scientific production associations, which was made by the sectorial All-Union Scientific Research Institute of Analytical Instrument Making (Kiev). It should be noted that both the amount of the economic impact and the duration of developments at individual scientific production associations are not compared, therefore here, for the most part, the dynamics of these indicators is examined.

**The data are for 1981 (the Termopribor Scientific Production Association has not operated since 1982).

The retrospective analysis of the activity of scientific production associations as a whole confirms the advisability of using the form being examined of the integration of science and production. The basic indicators of the efficiency of the activity of scientific production associations are improving noticeably. Thus, for the group of surveyed scientific production

associations the average duration of 1 development decreased during 1975-1982 from 3.2 to 2.9 years, that is, by approximately 4 months, while the economic impact, which is obtained per ruble of expenditures on scientific research and experimental design work, increased from 2.6 to 6.3 rubles (see Table 1). However, with respect to a number of scientific production associations a stable tendency for the efficiency of scientific and technical developments to increase was not observed. At several of them the duration of the "science-production" cycle is decreasing as a result of the inadequate pilot experimental development of new technical or technological approaches, as well as the artificial division of major developments into a number of more minor ones. When evaluating the efficiency of the activity of the majority of scientific production associations not the annual economic impact, which was actually obtained and confirmed by the client, but only the estimated annual economic impact is taken into account. As a whole the potentials of the scientific production associations, which are operating in the sector, in the matter of the acceleration and the increase of the technical and economic level of developments and the forecasting of the scientific and technical development of the corresponding subsectors of industry are not being fully utilized.

The further development of scientific production associations and the increase of the efficiency of their activity require specific organizational and economic changes with respect to a number of aspects of their operation. First of all, this concerns the specification of the place of scientific production associations in the system of sectorial scientific and technical organizations, enterprises and production associations, as well as the functions being performed by them. Initially it was assumed (and this found reflection in official materials)[1] that the scientific production association would carry out the entire set of operations on the development of new equipment up to the placement of the product into series production, but without taking a direct part in it. It is obvious that in case of the indicated approach to the formation of the scientific production association the scientific and technical subdivisions are called upon to play the leading role in it, while production should be pilot experimental production and be represented by a large pilot plant. Such a version of the establishment and the organization of the activity of the scientific production association can be called classical on the condition that all the enterprises and organizations, which are a part of it, lose the right of a legal entity, but in economic practice it is encountered extremely rarely.

The analysis of the activity of the group of scientific production associations showed that only a few associations operate in accordance with this arrangement. Among them it is possible to single out, for example, the Moscow Spektr Scientific Production Association, which is one of the best in the sector. At the majority of associations a significant, and at times a dominant role belongs to series production.

Many economists justify the established direction of the activity of scientific production associations. Thus, Ye. Kosov assumes that in the scientific production association the leading role can belong to the production unit. "In such scientific production associations the scientific component is completely subordinate to the production goals, and the process

of its development is governed first of all by the production assignments, both current and long-range."[2] Ye. Skoblikov, who proposes to include all scientific research institutes, design bureaus and other independent subdivisions of the sphere of preproduction within production associations and to expand scientific production associations by the attachment of subordinate enterprises, also holds approximately the same position.[3] It is obvious that in such a case scientific production associations are transformed into typical production associations with a developed scientific and technical center.

Table 2

Dynamics of the Proportion of Fixed Production Capital and the Number of Industrial Personnel Engaged Directly in Production of Series-Producing Plants for a Group of Scientific Production Associations in 1975-1982*

Scientific production associations	Fixed production capital of series-producing works (percent of its total amount in scientific production association)				
	Years				
	1975	1976	1978	1980	1982
Analitpribor (Kiev)	70.0	74.0	76.1	77.5	77.5
Impul's (Severodonetsk)	67.9	69.8	64.5	66.1	61.2
Signal (Tashkent)	68.1	67.2	68.4	72.0	72.0
Spektr (Moscow)**	8.9	10.1	11.7	12.2	13.5
Elva (Tbilisi)	82.4	85.8	86.5	82.0	83.8

Scientific production associations	Number of industrial personnel engaged directly in production of series-producing plant (percent of total amount in scientific production association)				
	Years				
	1975	1976	1978	1980	1982
Analitpribor (Kiev)	50.1	59.0	59.0	60.2	61.3
Impul's (Severodonetsk)	81.7	81.8	81.7	80.7	72.9
Signal (Tashkent)	95.0	95.0	95.8	96.7	97.0
Spektr (Moscow)**	22.6	22.1	22.1	22.9	23.9
Elva (Tbilisi)	70.9	73.9	75.5	75.3	74.7

*Calculated on the basis of the data of the analysis of the activity of the group of scientific production associations, which was made by the sectorial All-Union Scientific Research Institute of Analytical Instrument Making (Kiev).

**The indicators of the pilot experimental plant.

The possibility of such a transformation of associations exists not only theoretically. The analysis of the development of a group of scientific production associations of the country over a number of years showed that an

increase of the proportion of the fixed production capital of the series-producing plants in the total amount of fixed capital of the associations is observed in those associations which contain series-producing plants as structural units. The proportion of industrial personnel engaged directly in production of the series-producing plants in the total number of workers of the associations also increased in this group of scientific production associations. It is possible to trace from the data of Table 2 the dynamics of the indicated processes at several scientific production associations of the sector, as well as their peculiarities at an association, which contains a series-producing plant with the rights of a legal entity (the Impul's), and at an association, which does not have a series-producing plant, but turns out series-produced products at a pilot enterprise (the Spektr). At the Impul's Scientific Production Association the leading increase of the fixed capital and the number of personnel of the scientific and technical subdivision of the association is observed, which indirectly confirms the leading role of scientific research institutes in it. Basically the opposite trend is characteristic of the other associations, including the Spektr Scientific Production Association, which makes it possible to infer the weakening of the positions of the scientific research institutes (design bureaus) in these scientific production associations. If, for example, the tendency for the leading increase of fixed production capital and the number of industrial personnel engaged directly in production of the series-producing plant of the Signal Scientific Production Association remains unchanged, on the basis of the corresponding equations of the trends ($Y_1=65.5+0.93t$; $Y_2=95.1+0.28t$) it is possible to calculate that by 1985 the proportion of fixed production capital (Y_1) of series production in its total amount for the association will increase to 75.7 percent, while the number of industrial personnel engaged directly in production (Y_2) will increase to 98.2 percent. However, with respect to a number of scientific production associations of the sector it is now already possible to assert that the quantitative changes in their structure have turned into qualitative changes, that is, scientific production associations have become in essence production associations.

The efficient use of the capacities of pilot plants is urgent for scientific production associations. With respect to the surveyed scientific production associations only the capacities of the pilot plant of the Impul's Association are completely busy with pilot experimental operations. At the other associations significantly more than half of the capacities of the pilot enterprises have been set aside for the output of series-produced products. At several of them the proportion of these products comes to 86-99 percent of their total amount. It is obvious that such plants can only conditionally be called pilot plants. A similar situation also exists in other sectors of industry. "The ministries are not striving to turn over to enterprises of the sector the new products, which have been assimilated by a scientific production association, but are consolidating their production at the association itself. As a result the production capacities of pilot enterprises have to be increased."[4] However, it should not be thought that industrial enterprises are underestimating the role of pilot experimental production. The reason here is different: the high growth rate of new series-produced products, for example, in the group of scientific production associations, is often not backed by the corresponding increase of capital investments in the development of capacities for their production. In the

absence of reserve capacities the ministries are forced to expand series production at pilot enterprises. Under the formed conditions this is the only possibility of fulfilling the new assignments on the production of new equipment. Starting in 1984 the State Planning Committee, USSR ministries and departments and the councils of ministers of the union republics are obliged to envisage in the plans the creation of reserve capacities for the preparation of the production and the assimilation of the output of new types of equipment and materials. Here it is important to observe the requirement, according to which the greater the pace of the production in it of new products is, the larger the amount of reserve capacities in some sector or union republic or other will be.

The system of evaluating their activity, which is being used, and the formed cost accounting mechanism as a whole are promoting the process of increasing the dominant role of series production in scientific production associations. The managers of scientific production associations, as of ordinary production associations, bear responsibility first of all for the fulfillment of purely production, and not scientific and technical, assignments. Under such conditions of activity assignments on the increase of labor productivity and the profit, the decrease of the product cost and the increase of profitability are being established even for the pilot plants of scientific production associations.

The cardinal solution of the indicated problem is envisaged by the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (1983), in which a number of ministries and councils of ministers of the union republics are permitted to change individual scientific production associations over to the planning of their activity with respect to the sector "Science and Scientific Service," as well as to broaden the practice of organizing at associations and enterprises temporary scientific production subdivisions for the most important national economic problems. The implementation of these innovations in practice requires the analysis and generalization of the activity of scientific production associations for the purpose of substantiating the need for the shift of this organizational form of the integration of science and production to a new, qualitatively higher level of its development.

Within the existing cost accounting mechanism not one scientific production association can effectively fulfill to an equal degree the functions of scientific, technical and production activity; with time either the development of new equipment will begin to dominate over series production or, on the contrary, series production will subordinate the development of scientific and technical activity to its local interests.

It is economically inefficient to include powerful series-producing plants within a scientific production association. In the structure of a scientific production association scientific research institutes (design bureaus) are actually called upon to play the leading role. However, in case of the fundamental unity of the structural subdivisions of a scientific production association in principle the probabilistic nature of activity becomes characteristic of not only scientific research institutes (design bureaus),

but also series-producing plants. At the same time for the assurance of the great efficiency of series production, which realizes the scientific and technical developments of a scientific production association, and the timely movement of its new final product to the sphere of consumption, on the contrary, a certain stability of the concluding stages of the "science-production-consumption" cycle is necessary.

The suggestions on the significant simplification of the economic relations between the structural subdivisions of a scientific production association and the substantial decrease of the difficulties in the organization of the coordinated planning and management of the individual stages of the "science-production" cycle in most instances did not prove to be correct. This appears especially clearly in the relations of the scientific and technical and the production subsystems of scientific production associations. The reasons for the arisen situation are: the fact that the structural units of a scientific production association have independent balance sheets; the different category of the latter in the remuneration of labor; the isolation of the systems of accounting, planning and financing.

Moreover, when establishing scientific production associations, which contain series-producing plants, only a negligible portion of the economic relations between the scientific and technical subdivisions and series production is localized. The point is that more series-producing plants than belong to the association can operate in accordance with the developments of the scientific research institutes and design bureaus, which are included in the scientific production association. Thus, more than 10 enterprises and associations are implementing the developments of the Severodonetsk Impul's Scientific Production Association, while only 1 series-producing plant with the rights of a legal entity belongs to it. Therefore even the hypothetical gain in the simplification of a number of economic relations, which are due to the establishment of the scientific production association, in their total amount is extremely negligible.

In the process of analyzing the activity of individual scientific production associations substantial fluctuations in the number of scientific and technical developments, which are completed and introduced annually, were established. In 1975-1982 the minimum and maximum number of such developments came to: in the Temp Scientific Production Association--respectively 1 and 6, the Elva Scientific Production Association--2 and 10, the Impul's Scientific Production Association--3 and 26, the Mikroprovod Scientific Production Association--12 and 27 and the Spektr Scientific Production Association--17 and 26. Here the average annual number of completed developments with respect to individual scientific production associations ranged from 4 (the Temp Association) to 21 (the Spektr Association). It is quite obvious that such an uneven flow of technical innovations can be assimilated in good time and efficiently only at several series-producing enterprises. At all the surveyed associations, which put out series-produced products, only one series-producing plant is a part of them. In this connection it is difficult to find arguments which explain the advantages of this organizational structure of the scientific production association. Moreover, the fact that the capacities of the series-producing plants, which are a part of the scientific production association, are only partially busy with the output of products which were

developed by the scientific research institutes (design bureaus) of the association, is important. The indicated plants produce a significant portion of the products in accordance with developments of scientific research institutes and design bureaus, which are not a part of any association. The proportion of such products in their total amount in recent years has come, for example, at the Signal Scientific Production Association to more than 34 percent, the Spektr Scientific Production Association--38 percent and the Elva Scientific Production Association--70 percent. The indicated indicator comes to slightly more than 5 percent only at the Impul's Scientific Production Association, the leading one of the sector.

What has been stated makes it possible to draw the conclusion that the inclusion of series-producing plants in the scientific production association does not lead to appreciable positive results. Therefore the production subsystem of the scientific production association, in our opinion, should be represented only by the pilot experimental works, which, as E. Torf stresses, fulfills two economically different functions: it carries out the necessary pilot and experimental operations; it puts out small series of products, the pilot checking of which has been completed, but series production has not been started in connection with a delay of construction, designing and assimilation or owing to the negligible need for them.[5] Here it is quite understandable that the former function of the pilot experimental works should be dominant.

Precisely the indicated type of scientific production associations should be changed over to the planning of their activity with respect to the sector "Science and Scientific Service," having carefully determined the need for scientific production systems of this sort.[6] It is advisable to transform those scientific production associations, which it is inefficient to change over to the indicated planning, into production associations, having strengthened their production subsystem by the inclusion of a number of independent series-producing enterprises and having made it the leading one. The advisability of the indicated measure should be decided for each scientific production association individually by the making of careful technical and economic calculations and the analysis of the predictions of the development of science and technology.

The setting up of production associations with a powerful scientific and technical center is not an alternative to scientific production associations, but, on the contrary, acts as a necessary independent unit of the acceleration of scientific and technical progress in the national economy. Experience of the efficient activity of such associations has been gained in USSR machine building. Among the production associations with highly developed scientific and technical centers are, for example, the Kiev Elektronmash and Tochelektropribor associations, which are capable of solving major sectorial and national economic problems, by setting up for this temporary scientific production subdivisions.

So that the changeover of scientific production associations to the planning of their activity with respect to the sector "Science and Scientific Service" would not cause the weakening of their relations with production, a number of enterprises and production associations, the type of output of which coincides with the nature of the developments of the scientific production associations,

should be attached to them. In the future it is necessary to specialize as much as possible the enterprises and production associations, which are attached to the scientific production association, in the output of products in accordance with the developments of this association. It is possible to achieve this by the establishment of direct long-term scientific and technical relations between them. The scientific production association should play the leading role in this scientific production complex, as well as carry out the procedural supervision of the development of new equipment. It is natural that it, along with the enterprises and production associations attached to it, should bear the responsibility for the scientific and technical level of the developments of the corresponding direction.

The implementation of the indicated organizational measures will create the prerequisites for the actual conversion of the scientific production association into the scientific and technical center of the sector (subsector). A certain reorientation in the structure of the activity of the scientific production association can also contribute to this. The study of the operation of many scientific production associations showed that along with the development of fundamentally new equipment many of them are busy with operations of a simulation nature and with the modernization of operating equipment. Without belittling in the least the importance of the indicated work, however, let us note that plant research laboratories or design bureaus can perform it successfully. Apparently, the need has arisen to analyze in detail the themes of the scientific production association for the purpose of concentrating its activity on the accomplishment of major national economic tasks. The division of labor between the scientific production association, independent scientific research institutes and design bureaus, as well as the plant sector of science is extremely necessary.

It is also important to direct attention to another anomaly in the structure of the scientific and technical activity of the scientific production association, which consists in the fact that the development of new items, as a rule, does not conclude with the development of the technology of their production. Owing to this new items are often produced in accordance with an obsolete processing method, which requires large expenditures of living labor and thereby aggravates the shortage of human resources.

Scientific and technical progress can be characterized as the process of the succession of processing methods, in which each subsequent one is more economical than the preceding one. The role of scientific production associations in this process should increase significantly. Jointly with the technological centers of the sector, the organizations, which are the developers of automated control systems of technological processes, and the users of new equipment the scientific production associations are obliged to develop new technological processes (or to adapt them) in accordance with the type of their developments. In this connection the problem of coordinating the labor of the developers of scientific production associations and the developers of the preproduction services of the enterprises, which are assimilating the new product, requires an efficient solution.

At present the developers of new equipment perform scientific research and experimental design work independently from the preproduction services. As a

result the peculiarities of one enterprise or another and the shortage of manpower, material and technical resources are poorly taken into account, which leads to numerous modifications of the technical specifications at the stage of plant preproduction, to the decrease of the quality of the new equipment and to the lengthening of the "research-production" cycle. The efficiency of the development of new equipment would increase greatly, if the developers of scientific production associations would perform the final stages of the scientific research and experimental design work jointly with the preproduction specialists of the enterprises, which are going to assimilate the new items. The proposed arrangement of the cooperation of labor can be considered one of the forms of the manifestation of the long-term direct scientific and technical relations of the scientific production association and the enterprises and production associations, which are attached to it. This means will make it possible to reduce to a minimum the amount of work on preproduction and thereby to shorten the duration of the "research-production" cycle. The implementation of the indicated suggestion will be especially urgent under the conditions when the users of new equipment are material responsibility for the breakdown of equipment which was developed in accordance with their orders.

The development of new equipment, which would accumulate the achievements of modern science and would take into account the requirements of the users, presumes the launching of forecasting and marketing studies in the area of the production engineering development of the sectors of industry. The analysis made by us makes it possible to assert that far from all scientific production associations elaborate forecasts of the long-range need of the sectors for new equipment and technology and inadequately coordinate intrasectorial research and development. These and other oversights in the activity of scientific production associations are not conducive to their transformation into powerful scientific and technical complexes, which actually conform to the technical level of the product being designed and to the advanced nature of the technology of its production. The transition from the development of individual types of items to the designing of the latest promising systems of tools of labor, interchangeable construction materials and the final product for the meeting of a specific set of needs of society is a fundamentally important task of scientific production associations.

The efficient operation of scientific production associations is impossible without the adequate balance of the capacities of their structural units. The increase of the degree of disagreement in the capacity of their structural units with the transition from scientific research to planning and design developments and, further, to pilot experimental production is characteristic of many scientific production associations. The disproportions of the capacities of the structural subdivisions of scientific production associations have the result that a significant portion of the developments get into series production, bypassing the pilot experimental subdivisions, while this dictates the need for numerous alterations of new equipment already at the stage of series production.

The lack of the necessary balance of the capacities of the structural subdivisions of scientific production associations is due to a number of factors, the basic ones of which are: first, the nonoptimal structure of the

expenditures on research and development (the expenditures on the industrial assimilation of developments are usually less than the outlays on scientific research work); second, the imperfection of individual components of the internal cost accounting mechanism, which hinders the dynamic change of the ratios between the structural subdivisions of scientific production associations. This has the result that the changes in the nature and directions of scientific research and experimental design work are not accompanied by the corresponding changes of the ratios of the capacities of the structural subdivisions owing to the extreme sluggishness of the latter.

It is necessary to seek a way out of the formed situation, probably, in the broadening of the rights of scientific production associations, especially in the area of the prompt shifting of resources. It is also necessary to elaborate procedural recommendations on the substantiation of the ratios of the capacities of the basic structural subdivisions of scientific production associations. The structure of scientific research and experimental design work, that is, the ratios between the expenditures of labor of the subdivisions which are performing this work, should be the basis of the indicated ratios. When substantiating the optimum organizational structure of scientific production associations one should take into account the probabilistic nature of their operation and the losses from the shortage or surplus of the capacity of the individual scientific production units of the association. As the analysis of the activity of scientific production associations of machine building showed, the losses from the shortage of capacities of the subdivisions, which perform the finishing operations of scientific research and experimental design work, are tending to increase (the value of unfinished developments is increasing). This factor, along with the probabilistic nature of scientific research and experimental design work, dictates the need for the creation of reserve capacities in the indicated subdivisions.

Thus, the setting up of scientific production associations in machine building and other sectors of industry acts as an important form of the integration of science and production and a significant factor of the acceleration of scientific and technical progress. At the same time the potentials of ccccccccccccscientific production associations at present are obviously being used inadequately. The further development of scientific production associations and the increase of the efficiency of their operation in the sectors of industry require first of all the optimization of their organizational structure, the specification of the functions being performed, the increase of pilot experimental production and the qualitative improvement of all the components of the economic mechanism.

FOOTNOTES

1. See "The Statute on the Scientific Production Association," "Sovershenstvovaniye khozyaystvennogo mekhanizma. Sbornik dokumentov" [The Improvement of the Economic Mechanism. A Collection of Documents], Moscow, "Pravda", 1980, p 258.

2. Ye. V. Kosov, "Intensifikatsiya nauchnykh issledovaniy i razrabotok" [The Intensification of Scientific Research and Development], Moscow, "Ekonomika", 1983, p 50.

3. See Ye. A. Skoblikov, "The Scientific and Technical Revolution and the Development of Production Systems," IZVESTIYA AKADEMII NAUK SSSR. SERIYA EKONOMICHESKAYA, No 3, 1983, p 51.

4. K. Taskir, "At the Junction of Science and Production," SOTSIALISTICHESKAYA INDUSTRIYA, 2 February 1983.

5. E. M. Torf, "Ekonomika opytnykh proizvodstv" [The Economics of Pilot Works], Moscow, "Ekonomika", 1983, p 7.

6. The substantiation of the necessary number of scientific production associations in one sector or another of industry and the national economy is an important independent scientific problem, which requires a qualified solution.

Ratios, Efficiency, Prospects

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 10, Oct 84 pp 57-61

[Article by Candidate of Economic Sciences L. Minin: "The Scientific Production Association: Ratios, Efficiency and Prospects of Development"]

[Text] The acceleration of scientific and technical progress is one of the basic directions of the intensification of social production. The realization of this direction in many ways depends on the process of the integration of science with production. Scientific production associations, the most important advantage of which consists in the shortening of the "research-production" cycle, were a promising form of the combination of science and production. Now such a shortening is being achieved, for the most part, by the factor of the improvement of the organization of the development and introduction in production of new equipment and technology. So far in most instances the existing scientific production associations have more an administrative organizational than an economic unity. But even in such a form they have demonstrated their efficiency.

The established practice of planning the technical and economic indicators of the work of these associations is hindering the manifestation of all the advantages of scientific production associations in the matter of accelerating the development and introduction of new equipment: it preserves for the structural units, which were included in the scientific production association, its former sequence. The planning of the development of science is frequently carried out in isolation of production. Here the assignments are established not for the association as a whole, but directly for each of its structural units. For pilot plants the plans are approved according to the same list of indicators as for series-producing plants. The former

systems of reporting and stimulation, as well as the evaluation of the activity of the structural units of scientific production associations are being preserved. Therefore the overcoming of the isolation in the activity of the scientific and the production parts of scientific production associations--by the development of an economic mechanism of the management of this qualitatively new system, which is called upon to meet the needs of the national economy for the acceleration of the development and assimilation of new, highly efficient equipment--is an important task.

Among the external factors, which are responsible for the isolation of the scientific and production units of scientific production associations, there is, first, the functional discrepancy in the activity of the scientific and technical and the economic planning organs of management, which leads to the imbalance of the assignments on science and production, which are approved for associations, and to the dispersal of the resources being allocated. Given the formed system of management the planning of production is carried out by the economic planning administrations of the sectors and the corresponding departments of the subsectors, while the planning of science is carried out by the scientific and technical administrations of the sectors and the departments of scientific research and experimental design work of the subsectors. Therefore the likelihood of discrepancies of the plans of production with the plans of the development of new equipment is rooted in the upper levels of management. It is natural that the attempts at the practical coordination of the unbalanced control figures on the development of science and on production at the level of scientific production associations most often end in failure.

The second external factor of the isolation of the structural units of the association is the lack of a methodological solution of the problem of establishing the price for its scientific products and, consequently, the impossibility of an overall value estimate of the results of its activity. The solution of this problem involves the recognition of the productive nature of labor in the sphere of applied science. Theoretically the fact of the transformation of science into a productive force of society is realized, but in practice the scientific and technical results, which are expressed in the form of technical specifications, models, reports, descriptions, instructions and information services, do not have a value estimate. In reality by the product of a scientific production association one should understand all its types, which can find application outside the association (designs and technical specifications, prototypes, test runs of items and materials, as well as stands and devices, which have been developed for the conducting of tests and the development of new equipment), and, moreover, the results of the work of the subdivisions of the scientific production association with respect to the functions of the main organization, with respect to the attached direction of technology (scientific and technical forecasts, the analysis of operations, the study of the needs for new equipment and so on).

In our opinion, the indicator, which is close in its content to the standard net output, could be one of the possible versions of the value estimate of the scientific product. The profit, which is calculated according to differentiated standards which are established subject to the importance of each of the scientific operations (for example, the development of prototypes,

the formulation of technical specifications, standardization, technical and economic research and so on), should be added to the wage, which is credited in accordance with the various directions of activity.

The inadequate balance in capacity of the structural units belonging to them is also hindering the manifestation of the advantages of scientific production associations. The question of the formation of the basic ratios between the capacities of the scientific research, pilot experimental and production structural units is one of the basic ones both in case of the setting up of new scientific production associations and in case of the improvement of the organization of the scientific production activity and the structure of management in already existing associations. Many of them were set up in haste, according to formal attributes, without consideration of the specialization, scientific and technical relations and territorial distribution of the organizations and enterprises, which were being included in them, as well as the basic ratios, which were forming between the scientific research institutes (design bureaus), pilot experimental and production subdivisions of these scientific production associations.

Given the prevailing system of the separate planning, evaluation and stimulation of the activity of scientific production associations the latter frequently are not interested in having within them series-producing plants: the large series-producing plants, which are part of scientific production associations, suppress organizationally and economically the development of science; they are not interested economically in the proportionate development of science and production and especially in the acceleration of the development of science under the conditions of large disproportions in favor of series production. Today in many scientific production associations of industry disproportions in the direction of their production component are being observed. Thus, with respect to the indicators of the fixed production capital and the number of workers at the majority of scientific production associations the proportion of series-producing plants and pilot plants, which operate as series-producing plants, predominates in the total amount of fixed production capital and the total number of workers in the association (see the table). But at such associations as the Kishinev Mikroprovod Scientific Production Association and the Tbilisi Elva Scientific Production Association the proportion of the fixed production capital and number of workers of the series-producing plants comes to more than 70 percent, which characterizes them more as production than scientific production associations.

From the time of the formation of the greater part of the examined scientific production association and up to 1982 the disproportions in their activity in the direction of the production component increased even more (see the table). Such scientific production associations do not make it possible to use fully the advantages of the concentration of science and production, and not by chance are many of them "degenerating" into production associations (as happened with the Kishinev Volna Scientific Production Association and the Lvov Termopribor Scientific Production Association), while in such a form they do not have appreciable advantages over production associations in the matter of shortening the "research-production" cycle. During the past 5-7 years the average duration of this cycle at the majority of scientific production associations did not decrease or decreased very negligibly.

Characterization of Change of the Basic Ratios Between Structural Units of Scientific Production Associations* (percent)

Name of scientific production association and indicators	Year of formation of scientific production association	Structural units of scientific production associations					
		scientific research institutes (design bureaus)		pilot experimental plant(s)		series-producing plant(s)	
		in year of formation	in 1982	in year of formation	in 1982	in year of formation	in 1982
Mikroprovod (Kishinev)	1975						
amount of work		16.2	11.0	--	--	83.8	89.0
industrial fixed capital		9.2	27.0	--	--	90.8	73.0
number of workers		16.4	15.6	--	--	83.6	86.4
Impul's (Severodonetsk)	1971						
amount of work		17.7	10.3	--	3.4	82.3	86.3
industrial fixed capital		21.9	31.4	--	4.4	78.1	64.2
number of workers		17.2	18.3	--	7.5	82.8	74.2
Termopribor (Lvov)	1977						
amount of work		65.5	46.1	34.5**	53.9**	--	--
industrial fixed capital		--	--	--	--	--	--
number of workers		58.6	54.9	41.1	45.1	--	--
Spektr (Moscow)	1975						
amount of work		53.0	53.3	18.8**	19.8**	28.2	26.9
industrial fixed capital		81.1	79.8	8.8	6.7	10.1	13.5
number of workers		61.3	59.4	17.9	17.6	20.8	23.0

*The table was prepared on the basis of the data of a survey of the group of scientific production associations. Here for the association as a whole the value of the indicators, which characterized the ratios, was taken as 100 percent, after which the proportion of the structural units was determined.

**Actually this pilot plant is an enterprise of series production.

[Table continued on following page]

Name of scientific production association and indicators	Year of formation of scientific production association	Structural units of scientific production associations					
		scientific research institutes (design bureaus)		pilot experimental plant(s)		series-producing plant(s)	
		in year of formation	in 1982	in year of formation	in 1982	in year of formation	in 1982
Analitpribor (Tbilisi)	1974						
amount of work		57.8	23.3	42.2**	32.2**	--	44.5
industrial fixed capital		72.4	44.8	27.6	23.1	--	32.1
number of workers		64.5	39.0	35.5	27.0	--	34.0
Analitpribor (Kiev)	1978						
amount of work		21.9	19.8	--	--	78.1	80.2
industrial fixed capital		23.9	20.4	--	--	76.1	79.6
number of workers		40.4	39.5	--	--	59.6	60.5
Temp (Moscow)	1974						
amount of work		54.2	71.2	45.8	28.8	--	--
industrial fixed capital		70.3	63.1	29.7	36.9	--	--
number of workers		69.9	73.7	30.1	26.3	--	--
Elva (Tbilisi)	1971						
amount of work		37.2	7.2	16.1	3.9	46.7	88.9
industrial fixed capital		28.2	28.5	--	4.0	71.8	67.5
number of workers		46.3	27.7	--	9.0	53.7	63.3

** Actually this pilot plant is an enterprise of series production.

The specialists of scientific production associations believe that the inadequate capacity of the pilot experimental base of associations is the most important factor which is checking the acceleration of the "research-production" cycle. Meanwhile, if we examine them according to the formal attributes, the majority of scientific production associations have pilot experimental plants within them. In fact the greater part of them is enterprises of series production, since the proportion of pilot experimental operations comes at these plants to not more than 10-15 percent of the total volume of output. Here the bulk of the pilot experimental operations is performed at the pilot base of the scientific research institutes (design bureaus) themselves. Thus, for example, the Leningrad Burevestnik Scientific Production Association has pilot plants with a large volume of production of marketable output, of which pilot experimental operations account for only about 1 million rubles, while experimental operations in the amount of more than 2 million rubles are being performed at the pilot base of the main structural unit of this association. Consequently, two means in the development of the pilot experimental production of scientific production associations are emerging: first, the transformation of the plants, which are pilot in name, into truly pilot plants; second, the development of the pilot base of the main structural units.

The analysis of the composition and basic ratios of scientific production associations attests to the need for a more sound approach to the formation of the ratios of the associations being newly set up and operating associations. It is necessary to settle the question of the advisability of the inclusion of series-producing enterprises in the scientific production associations being set up and of the possibilities of the removal of large series-producing plants from already existing associations. For the forming ratios between science and production potentially contain and predetermine the success or failure of scientific production associations. In our opinion, a series-producing plant can be a part of a scientific production association only on the condition that it is completely specialized in the output of products in accordance with the type of association, is the only producer in the country of such products and is located territorially in the same region with the scientific research institutes (design bureaus).

Scientific production associations should have reserves for the constant maintenance of the necessary ratios between the capacities of their scientific research, pilot experimental and production units. Internal reserves potentially exist almost everywhere, but it is also necessary to have the opportunity to realize them--by the granting to the management of the association of the rights to redistribute promptly among its structural units the number of workers, the wage fund, the fixed capital and the working capital, by increasing or decreasing their capacity in conformity with the specifically established situation and increasing thereby the degree of utilization of the scientific production potential of the association as a whole. In other words, it is necessary to broaden the operational economic independence of scientific production associations.

The system of the remuneration of labor and material stimulation, which is in effect at scientific production associations, also has serious drawbacks. For

individual structural units of the association it preserves the former procedure of forming the stimulation funds, while a unified centralized material incentive fund of the scientific production association is not formed. Consequently, levers of the assurance of the unity of goals for the association as a whole are also absent. The approved procedure of the formation and use of the incentive funds of the scientific research structural units also has substantial drawbacks. The trend toward the study of minor themes is appearing already today, since, as compared with major, fundamentally new developments, for relatively minor improvements and the modernization of the output being produced it is easier to confirm the economic impact, to approve a markup on the price for it and to obtain from enterprises deductions from the profit. Major problems are worked on for a longer time, while the stimulating importance of the bonus, which is paid here in the form of an advance, is not large, since scientific research institutes (design bureaus) take advances unwillingly--due to the uncertainty of the future results and the large gap between the anticipated and actual economic impacts from scientific research and experimental design work. This circumstance entails the decline of the level of research and the decrease of the scientific reserve of organizations, as well as poses the problem of the current payment of bonuses to the developers of new equipment.

It is necessary to elaborate a procedure of the formation of the unified centralized material incentive fund of the scientific production association and to grant it the right to use this fund for the assurance of the unity of the economic interests of its structural units in the matter of realizing the goals of the entire association. Here it is not at all mandatory to do away with the formed mechanism of the formation of the incentive funds of the individual structural units of the scientific production association. It is necessary to find criteria for the deduction for the centralized material incentive fund (TsFMP) of the association of a specific proportion from the total amount of the incentive funds of its structural units. The centralized material incentive fund of the scientific production association should be used for the payment of bonuses to the management of the association and the workers of the subdivisions of the centralized management staff of the scientific production association for the results of its scientific production activity, as well as for the payment of bonuses to the workers who are engaged in basic theoretical research and the creation of the scientific and technical reserve.

The amount of the assets for the stimulation of the management of the association and the workers of the centralized management staff of the scientific production association can be determined on the basis of the wage fund of this category of workers and the average (for the association) percent of the bonus which is paid to engineering and technical personnel and employees for the results of their current activity. The amount of the assets for the payment of bonuses to the workers, who are engaged in the creation of the scientific and technical reserve, can be calculated on the basis of their wage fund and the average percent of the bonus which is paid to the scientists and engineering and technical personnel of the association for the development and introduction of new equipment. The assets determined in this way should become the amount which is liable to withdrawal for the centralized incentive fund of the structural units of the scientific production association.

The currently accepted and theoretically correct system of the stimulation of scientific research organizations, which orients them toward the development of highly efficient equipment and the shortening of the time of its development and assimilation, in practice frequently proves to be ineffective, since the prevailing procedure of the formation of the incentive funds of scientific research institutes (design bureaus) is effective for organizations, which develop new equipment, the national economic need for which is great, and is insufficiently well thought out for the scientific research institutes (design bureaus), which develop means of environmental protection and labor safety, complex instruments, machines and equipment of one-time and small-series need. Here the amount of the national economic need most often does not depend on the activity of the scientific research institutes (design bureaus), that is, they have been placed in advance in an unequal position.

Experience shows that a differentiated system of stimulation, which, within the framework of the general concept of the stimulation of the increase of efficiency and the shortening of the time of development, would make it possible to approach more flexibly the stimulation of the scientific research institutes (design bureaus), which are engaged in the creation of a scientific and technical reserve and the development of machines and instruments of one-time and small-series need, is necessary.

Along with drawbacks of a methodological nature, the existing system of the stimulation of the activity of scientific research institutes (design bureaus) also has organizational and legal drawbacks, among which are: the cumbersome procedure of the coordination and approval of the supply orders, the cards of the technical level of developments and the markups on the wholesale prices for products; the absence of the accounting of the economic impact, which is actually obtained from their developments in the national economy, and of legal norms which regulate its confirmation.

The successful performance of work on the further improvement of the cost accounting management of scientific production associations is possible only if there is a system of interconnected standard procedural materials, which would regulate all the aspects of the economic mechanism of their management, would reflect the specific sectorial nature of each of the associations and would have a high decree of specificity. Here the formulation of the majority of standard procedural materials depends on the close cooperation of the technical and economic sciences: this concerns materials on scientific and technical forecasting; on the determination of the scientific and technical level of development and research; on the development of standards of the transition from the technical parameters of instruments, machines and equipment to value economic indicators; on the determination of an efficient (standard) time of the development of new equipment. At scientific production associations the need for the development of standard and procedural materials on the basis of the close interconnection of technical and economic disciplines is being felt most acutely.

At present a large number of all-union standard procedural documents, which govern one aspect or another of the activity of scientific production

associations, do not exist. The most important of them, which the practice of management urgently needs, are:

the standard structure of the management of the scientific production association;

a statute on the formation and use of the centralized material incentive fund of the association;

the procedure of drafting a unified scientific research and experimental design industrial financial plan of the association;

a statute on the unified system of accounting and reporting for the scientific production association;

recommendations on the analysis and evaluation of the scientific production and economic activity of the scientific production association;

a statute on the remuneration of the labor of and the payment of bonuses to the workers of the centralized management staff of the scientific production association.

Not by chance do the majority of specialists of scientific production associations see the first factor, which checks the improvement of the accounting mechanism of the management of the development and introduction of new equipment, in the lack of a coordinated system of standard procedural documents, which specify the basic directions of the activity of scientific production associations. The lack of a direct dependence of the amount of the material incentive of the collectives of the structural units on their labor contribution to the end results of the activity of the entire association as a whole is considered the second such factor in importance.

For all the independent importance of each of the primary standard procedural documents listed by us, none of them can be drawn up in isolation of the others.[1] All the aspects of the economic mechanism are closely interconnected and should be improved in combination--in the connection of the planning, accounting, evaluation and stimulation of activity. The USSR State Committee for Science and Technology, in our opinion, should be in charge of the drawing up of these documents, with the mandatory enlistment in this matter of specialists of the leading scientific production associations of industry of our country.

With respect to a number of directions of the improvement of the economic mechanism of the management of scientific production associations it has been clear for a long time now what it is necessary to do. Therefore today the conducting of the economic experiment on the management of the scientific production associations of one of the sectors of industry, during which the suggestions expressed in the press on the establishment of the economic unity of science and production within associations of this type would be tested, is of interest.

The need for the elimination of the factors, which are checking the development of an effective mechanism of the management of scientific production associations, is also increasing in connection with the fact that the indicated drawbacks are giving rise to the tendency not to believe in the viability of this form of the combination of science and production. For the further development and fulfillment of their important role in the matter of shortening the "research-production" cycle scientific production associations should have flexible organizational structures and a solid cost accounting basis.

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FOOTNOTE

1. Experience shows that the attempts to draw up individual standard procedural documents within one department do not make it possible to bring them to practical introduction. Such, for example, was the fate of the draft of "Tipovaya metodika planirovaniya v nauchno-proizvodstvennykh ob"yedineniyakh s formami pyatiletnego i godovogo plana" [The Standard Method of Planning in Scientific Production Associations With Forms of the Five-Year and Annual Plan], Moscow, NIIPiN, 1982.

Educational Scientific Production Associations

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 10, Oct 84 pp 62-64

[Article by Candidate of Economic Sciences Docent V. Dedekayev (Lvov Polytechnical Institute): "Problems of the Development of Educational Scientific Production Associations"]

[Text] The gradual intensification and increase of the efficiency of social production are based on the improvement of the use of scientific achievements, new equipment and technology, which ensure the increase of the productivity of national labor and the saving of manpower and material resources. Interacting in their dynamic development, science and production mutually enrich each other with new forms and methods of cooperation.

The problems of the intersectorial coordination of scientific research and experimental design work have shifted from the center to the regions. Although the leading role in the determination of technical policy belongs to the sectors, the specific implementation of scientific and technical programs and the introduction of completed scientific research developments in production are carried out locally.

In the decree of the Ukrainian CP Central Committee and the Ukrainian SSR Council of Ministers "On Several Measures on the Further Improvement of the Management of Scientific and Technical Progress in the Republic" (1977) attention is focused on the regional aspects of the management of science and on the need to increase the role of the scientific centers of the Ukrainian SSR Academy of Sciences as intersectorial coordinating organs. Taking this

into account, the Lvov Oblast Committee of the Ukrainian CP and the Western Scientific Center of the Ukrainian SSR Academy of Sciences developed a system of the regional management of scientific and technical progress, which is based on the coordination of the activity of more than 60 scientific research institutes, higher educational institutions, planning and design organizations, production enterprises and associations of various sectors of the national economy by the organization of their participation in the fulfillment of regional scientific and technical comprehensive goal programs. The creative cooperation of these organizations led to the formation of interdepartmental special-purpose scientific production associations, which became a part of the interdepartmental special-purpose scientific production complexes: instrument making, machine building, geological-geophysical and agricultural. The Presidium of the Ukrainian SSR Academy of Sciences approved of the experience of the Western Scientific Center of the Ukrainian SSR Academy of Sciences on the regional management of scientific and technical progress on the basis of the establishment of interdepartmental special-purpose scientific production complexes (MTsNPK's).

In the formulation of regional scientific and technical comprehensive goal programs the leading role belongs to higher educational institutions, since their personnel constitute the basic scientific potential locally. Thus, more than 12,000 scientific and scientific teaching personnel work at the 25 higher educational institutions and 50 academic and sectorial scientific research institutes and their subdivisions, which are located in the western oblasts of the Ukrainian SSR. This scientific potential is broken down by departments in the following manner: 85 percent of the scientists with scientific degrees and titles work at higher educational institutions, 10 percent work in the system of the Ukrainian SSR Academy of Sciences and 5 percent work at sectorial scientific research institutions.

The intensification of scientific research requires the expanded reproduction of scientific personnel. As is known, it is ensured by the graduates of higher educational institutions, who are most capable of scientific work. Practical experience has shown that at higher educational institutions the training, education and selection of talented developers and scientists are accomplished much more effectively than at scientific research institutes. The participation in scientific research work of professors and instructors, graduate students and undergraduates decreases the need for manpower resources which are necessary in the sphere of scientific activity. The use of the scientific equipment of higher educational institutions in the educational process and of the production base of industrial enterprises for scientific and educational purposes contributes to the decrease of the expenditures on the conducting of scientific research work and the training of students and to the increase of the quality of the training of specialists.

The search for new forms of the strengthening of the contact of science with production as a result of the improvement of the interdepartmental special-purpose scientific production complexes led to the formation of educational scientific production associations (UNPO's) on the basis of higher educational institutions, enterprises, institutions and organizations of various sectors of the national economy. Such associations have been set up at the polytechnical and forestry engineering institutes in Lvov, at the Ivano-

Frankovsk Institute of Petroleum and Gas and at other higher educational institutions of the western region of the Ukrainian SSR. The educational scientific production association is an organization, which operates as a voluntary service and fulfills scientific and technical comprehensive goal programs on the basis of the creative cooperation and economic contracts of collectives.

Eight educational scientific production associations: the Energetik, Elektro, Khimik, Geodeziya, Tekhnika, Sistema and Stroitel', are in operation at Lvov Polytechnical Institute [as published]. Each educational scientific production association consists of sections. Chairs of the institute and a group of industrial enterprises, which are similar in specialization, belong to such a section. The management of the educational scientific production association is carried out by the council of the association, which is set up on a parity basis by the parties participating in it. A responsible secretary is elected for the monitoring of the progress of the fulfillment of scientific research work and the adopted decisions, as well as for the preparation of meetings of the council. The council examines the drafts of long-range and current plans, the reports on the progress and results of joint work and questions of the introduction of the results of scientific research work.

The scientific experimental laboratories and production base of the institute and plants are the material base of the educational scientific production association. For the development of each new processing method and the performance of experimental work the enterprises make available to the performers of the work the necessary experimental base for temporary use free of charge. The parties reserve the authorship and right of publications in conformity with their participation in this work.

The increase of the demands on the fundamentality, quality and effectiveness of scientific research, as well as the scope of this work at the educational scientific production association raised the question of the further improvement of its organization. The need for the creation of a special management staff of the educational scientific production association has now already arisen, since the responsible secretary of the council, who works on a voluntary basis, is not capable of performing the functions of the day-to-day regulation of scientific research work at the proper level. Apparently, the management staff of the educational scientific production association should combine scientific and administrative divisions. When forming the organizational structure of the management of the educational scientific production association one should not stick to the traditional line staff arrangement, but the changeover to a matrix structure of its management is possible. In case of it the scientific research subdivisions and individual performers of scientific research work come under the influence of the administrative hierarchy of the higher educational institution and the scientific supervisors of the scientific and technical comprehensive goal program.

Enterprises of Lvov and Ivano-Frankovsk oblasts belong to educational scientific production associations with the participation of Lvov Polytechnical Institute. At the same time hundreds of industrial enterprises of the western oblasts of the Ukraine remain outside the sphere of regional

integration with science. It is natural that this is affecting the rate of their scientific and technical progress. At the higher educational institute such a situation is giving rise to a certain study of minor themes: scientific research work is being conducted in accordance with contracts with individual enterprises, but not with groups of similar enterprises. Thus, in 1981 scientific research at this educational scientific production association was conducted on 65 themes (in the amount of 1,470,100 rubles, or 21,000 rubles a year on the average per theme).

From the standpoint of the higher educational institution and each individual performer the further increase of the number of enterprises, which belong to the educational scientific production association, is not advisable: the experimental base is sufficient, and practical introduction is ensured. There is also no need to increase the amount of scientific research work, since the available wage fund is sufficient for the participation of the professors and instructors of the characteristic chairs. Thus, there is no basis for the extensive increase of the number of researchers, while the intensification of scientific research work is being checked by limitations in the amounts of remuneration of the holders of several jobs, the graduate students and undergraduates, who are performing work in accordance with economic contracts. Moreover, the increase of the amount of scientific research work entails the need to obtain the planned fourfold increase of the actual economic impact from its introduction.

From the standpoint of national economic interests the educational scientific production association should be enlarged by the inclusion of a larger number of enterprises of the region and, consequently, the increase of the amount of scientific research work being performed, but here it is necessary to consider without fail the economic interests of the performers.

All the activity of the educational scientific production association is aimed at the fulfillment of the scientific and technical comprehensive goal programs, which are formulated in each section of the educational scientific production association--in conformity with the scientific directions and with allowance made for the needs of the enterprises, which belong to the association and finance the economic contracts. The long-range and current plans of the work of the sections of the educational scientific production association are formulated on the basis of the goal programs (scientific and technical comprehensive goal programs). In spite of the tendency to study minor themes, the use of the goal planning of scientific research work has begun to be of a more comprehensive nature, the scientific and technical comprehensive goal program of the educational scientific production association is linked with the regional and sectorial scientific and technical goal programs by the combining of similar themes and the use of a unified system of the coding of scientific research themes.

Problems of linking the scientific research work of higher educational institutions with the research of academic institutes are arising. So far cooperation and the compatibility of their themes are being ensured by coordinating plans, but for their better cooperation it is necessary to adopt plans of joint work. The formulation of such plans is accompanied by several difficulties: at the educational scientific production association the

scientific and technical comprehensive goal programs encompass the period to 1990, while at the USSR Academy of Sciences the basic directions of research in the area of the natural and social sciences for this period are still at the stage of formulation. More extensive cooperation with the Ukrainian SSR Academy of Sciences in the training of scientific personnel is also required. It is also possible to think about the establishment in the western region of the Ukrainian SSR of joint scientific educational centers of the Ukrainian SSR Ministry of Higher and Secondary Specialized Education and the Ukrainian SSR Academy of Sciences.

At the educational scientific production association basic scientific research work is planned and financed centrally. A portion of this work is being performed by 13 sectorial laboratories of Lvov Polytechnical Institute. The educational scientific production association is taking part in the implementation of five scientific and technical comprehensive goal programs (such as "Robots and Robotic Systems," "Energy," "Environmental Protection," "The Automation of Experimental Research and Tests," "The Program of Scientific and Technical Progress and Its Socioeconomic Consequences for 1986-2005 for the Ukrainian SSR") and four programs of the USSR State Committee for Science and Technology, the Ukrainian SSR State Planning Committee and the Ukrainian SSR Academy of Sciences.

Certain problems of linking basic and applied scientific research work are also arising.

The development of the educational scientific production association is being checked by the existing system of the remuneration and stimulation of the labor of professors and instructors, who when performing scientific research work through the combining of jobs work in the positions of senior and junior scientific associates. Unfortunately, the payment for the work on economic contractual themes does not depend on whether or not they are performed within the educational scientific production association. The very amounts of salaries in the scientific research sector of the higher educational institution comes to not more than 35 percent of the salary of the position held jointly. The supervision of themes is also being poorly stimulated (an increment in the amount of 6 rubles a month is paid for the supervision of a theme). In the past 3 years the standard of the wage fund, which is established for the institute by the Ukrainian SSR Ministry of Higher and Secondary Specialized Education, has decreased from 41 to 34 percent of the amount of work which is performed in accordance with an economic contract. The system of the payment of bonuses for the performance of scientific research work, which is in effect at the higher educational institution, also needs revision.

The further improvement of the educational scientific production association is possible only by its development into a cost accounting educational scientific production association, with the creation for it of its own fund for the development of the scientific base, material stimulation fund and fund for sociocultural measures and housing construction. Such centralized funds of the educational scientific production association will become the source of the financing of scientific and technical progress and the improvement of educational and training work. In other words, the educational scientific

production association should function as a unified scientific research, experimental design and economic complex, which has been changed over to the new forms of planning and economic stimulation.

While delivering at the republic meeting of the party and economic aktiv (1982) the report "On the Progress of the Fulfillment of the Decisions of the 26th CPSU Congress and the 26th Ukrainian CP Congress on the Acceleration of Scientific and Technical Progress and the Strengthening of the Contact of Science With Production," V. V. Shcherbitskiy noted, along with other organizations of our republic, "which are making a worthy contribution to the increase of the efficiency of the national economy," the fruitful work of the collective of Lvov Polytechnical Institute. The activity of our order-bearing collective was honored with such a high appraisal for the search for new forms of the integration of science with production, a significant place among which belongs to the educational scientific production association.

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INTERNATIONAL S&T RELATIONS

U.S. RESTRICTIONS ON EXPORTS OF TECHNOLOGY

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 84 pp 18-21

[Article by Candidate of Economic Sciences Lieutenant Colonel I. Leonidov: "U.S. Control Over the Export of Strategic Materials and Technology"]

[Text] The activity of the ruling circles of the imperialist countries, and first of all the United States, in the area of economic, scientific and technical cooperation with the socialist states is governed by a number of political factors. The linking of these relations with ideological considerations, the extension to them of political interests and the aspiration to use their scientific, technical and economic potential for putting pressure on the socialist countries find vivid expression in the exercise of control over the export of strategic materials and technology (in the American press it has received the name of export control). Such activity has the greatest scope in the United States. The fact that the state monopoly regulation of foreign economic relations is a lever of active influence of the bourgeois state on the entire sphere of economic relations with other countries and entire regions, is traced especially clearly here. The programs of aid to other countries, foreign trade and scientific and technical cooperation served and are serving as a tool of the military political strategy of U.S. imperialism, a means of saving and the extension of the American way of life to the entire world.

U.S. export control encompasses trade with not only socialist, but also developed capitalist and developing countries. The U.S. military political leadership is increasing the trade policy pressure on competitors, seeking from them concessions for the penetration by American goods of their domestic markets. Large U.S. corporations, which strengthened their position in the world economy after World War II, are constantly using the export of goods and technology to Western Europe and Japan as a means of influencing their policy and economy. The limitation of the possibilities of competitors in the implementation of such an important factor of economic growth as advanced technology is the basic goal of the control of the export of goods and technology.

The United States is attempting to approach from more and more rigid class positions the development of commercial, economic, scientific and technical relations with the USSR and other socialist states. Preserving unchanged the

policy "to trade with the political opponent for the sake of achieving political goals," the administration of President Carter took a number of steps on the strengthening of discriminatory restrictions in trade with the socialist countries. All the steps of the Reagan Administration in the area of export control are also based on the mechanism of trade discrimination with respect to the socialist states, which was developed back during the times of the Cold War.

The control of exports to the socialist countries was introduced in 1949. At present the practical activity in this area is carried out in conformity with the 1979 Export Control Act. It was adopted in place of a similar 1969 legislative act and preserved practically unchanged the entire export control system which has existed in the United States for more than 30 years.

In this law, as in the preceding one, there are named as the basic goals of export control: the guarantee of what is called U.S. "national security" (that is, its military strategic interests); the backing by economic measures of the foreign policy line of the ruling circles and the prevention of the escape of critical goods from the country. This control also applies to the export of goods and technology to capitalist countries (even U.S. allies), although it is aimed first of all against the states of the socialist community. Many U.S. corporations, which are working on military contracts, are speaking out against the transfer of military technology to the industrially developed European NATO countries and Japan. They link this position with the fact that foreign companies more and more often are leading American companies in the commercial use of military technology, which has been obtained from the United States, and are adapting it more rapidly for the needs of the civilian sectors of industry.

Senator H. Jackson, who expresses the interests of the U.S. military industrial complex, came forth with the demand to introduce a more stringent system of the issuing of permits for the export of technology to NATO countries and other states of the Free World. He demanded that the President be given the right to impose economic sanctions against states which would permit deliveries of controlled goods to socialist countries.

According to prevailing legislation the U.S. Government is empowered to control the export of goods and technology in the interests of foreign policy. In other words, export control is used as a means of exerting pressure for the purpose of changing the policy of other states in a direction essential for the American leadership. The attempt of the United States to exert pressure on the Arab OPEC member countries during the period of their imposition of the embargo on petroleum deliveries to the United States in 1973-1974 can serve as an example of the use of such sanctions. The U.S. President in 1974 was given by way of legislation the right to use export control for taking steps against countries "which limit U.S. access to sources of raw materials for the purpose of influencing its foreign policy."

In recent times the Reagan Administration has been making efforts to revise the 1979 law, and this issue is being discussed extensively in Congress. Specialists propose to shift the main emphasis to the control of the export of the technology of producing materials and finished items, which can be used in

the military area--from special alloys to semiconductors. At the same time it is proposed to simplify the obtaining of permits for the export of the items themselves.

During the second half of the 1970's and the early 1980's White House policy with respect to economic, scientific and technical relations with the USSR assumed a frankly discriminatory nature, which found expression in the following practical measures.

In May 1976 the U.S. Department of Commerce published new lists of goods which require the obtaining of a special permit for export to socialist countries.

In June 1978 the American President for the purpose of demonstrating his potentials in matters of economic pressure on the Soviet Union postponed indefinitely the issuing of a license to Sperry-Rand for the delivery to the USSR of a computer of the Univac-1100 series for use during the 1980 Olympic Games. At the same time the State Department transmitted to the governments of Great Britain, France, the FRG and Japan an official request of the President, which concerned the imposition in these countries of an embargo on the sale of a similar computer to the Telegraph Agency of the Soviet Union.

In January 1980 unilateral actions of the administration on the substantial cutback of trade with the Soviet Union in connection with the events in Afghanistan were announced.

In December 1981 Reagan announced additional restrictions of economic relations with the USSR in connection with the imposition of martial law in Poland. In particular, all flights of Aeroflot aircraft to the United States were suspended, the Soviet purchasing commission was closed, the issuing and renewal of licenses for the export of electronic equipment to the USSR were suspended, the list of petroleum and gas equipment, which was being delivered to the USSR in accordance with special licenses, was enlarged, while the issuing of licenses for its export was suspended, the decision was made not to renew Soviet-American agreements on exchange (for example, in the area of power engineering and scientific and technical cooperation), the term of effect of which was expiring.

In spite of the objections of West European states against U.S. attempts to frustrate the construction of the Urengoy-Pomary-Uzhgorod gas pipeline, on 18 June 1982 the military political leadership of the country announced the broadening of the economic sanctions against the USSR, having banned the deliveries of equipment for this purpose, which affiliates of American companies abroad had been making.

According to reports of the American press, export control applies to items of more than 200,000 descriptions. The value of their export in 1982 came to more than $20 billion, and countries, which are allied and friendly with the United States, accounted for about 90 percent of it. In case of the issuing of an export permit guarantees were required that the goods would not be resold to the USSR.

The aspiration not to give the Soviet Union access to modern equipment and technology on the pretext that they are ostensibly used for the strengthening of the military potential of the USSR, is an important direction of the discriminatory policy of the Reagan Administration in foreign economic relations with the socialist countries. The tightening up of export control over deliveries to the socialist countries began to be used in practice back under Carter. At that time the interference of the U.S. Department of Defense in the regulation of exports had already increased significantly. By the early 1980's it had drawn up a list of "critical technologies,"[1] which contained 16 descriptions of areas of the use of modern scientific and technical achievements, such as computers, microprocessors, laser equipment, tracking and guidance systems, microwave instruments, submarine systems and so on.

After Reagan arrived at the White House, a number of measures, which tightened up even more the policy of secrecy in federal departments and services, industry, universities and scientific centers, were implemented. Moreover, the more rigorous observance of the regulations of export control and the increase of the effectiveness of the work on the prevention of the transfer of advanced technology was required of government agencies. For example, for reducing the amount of unrestricted information the U.S. intelligence service and special subdivisions of the Department of Defense introduced more exacting regulations for the publication of technical information by scientific research institutes and laboratories of the country.

The Departments of Commerce and Defense, as well as the State Department play the main role in the organization and implementation of export control in the United States. They formulate policy in this area, draw up and revise commodity check lists and submit for the approval of Congress changes and additions to the corresponding legislation. Special organs, which are responsible for the introduction in practice of the control of the export of goods and issue permits for their export, operate within these state institutions. However, the U.S. leadership believes that they are not coping effectively enough with their tasks. In this connection the question of setting up a single independent organ, which is responsible for all export control, is being discussed in Congress.

In addition to this, a special automated information system, which will be the basic source of data which are necessary for making decisions with respect to the export of science-intensive goods and technology, is being developed in the Department of Defense.

According to a report of the American press, the U.S. Department of Commerce has also come forward with a proposal to tighten up the rules which regulate the export of those goods which, in the opinion of the administration, may be of military use. First of all this concerns science-intensive products: lasers and laser systems, semiconductors, equipment for the production of semiconductor materials and several others.

The proposed rules envisage a more strict procedure of the issuing of licenses, which enable the exporters to export several consignments of freight over a long time in accordance with one license, and not to seek a separate

license for each cargo. The Department of Commerce suggested that the exporter, when submitting an application, make available a list of the recipients of the commodity with an indication of the names and addresses, and such lists at the demand of the department should be updated quarterly. Moreover, the exporter is obliged to give more extensive information on the goods being licensed, including a general description and even their numbers in the official commodity check lists, to which export restrictions apply.

The United States is channeling considerable efforts into the gathering of information on the availability in the capitalist countries of advanced technology, which is similar to American technology and is accessible for import to the socialist countries. A special information center, which was set up within the Central Intelligence Agency, is engaging in this activity. The data prepared by the center are taken into account when examining the applications for the issuing of export permits, as well as when making decisions on the tightening up of export control.

While imposing more and more discriminatory restrictions on the export of goods and technology to the Soviet Union, the United States is also striving persistently to enlist in this activity other capitalist countries, first of all the members of the aggressive NATO bloc. The Coordinating Committee for Multilateral Export Control (COCOM), in the opinion of American specialists, should play the leading role here.

COCOM is an international organization, which does not have legislative power and is not legally registered and through which the developed capitalist countries carry out the coordination of policy and practical measures on the restriction of the export to the USSR and other states of the socialist community of goods and technology which are of "strategic importance." The initiative in the establishment of this organ belongs to the United States. At present 15 states--all the NATO countries (except Spain and Iceland), as well as Japan--are members of COCOM, which began to operate on 1 January 1950. The headquarters of the coordinating committee is in Paris and is located in a wing of the building of the U.S. Embassy in France. Thus, COCOM is a permanent intergovernmental organ, which actually operates under the aegis of NATO, but formally is not a part of the system of this aggressive bloc.

The Reagan Administration in 1981 made a number of attempts to tighten up export control within COCOM. At the conference of the heads of state and government of the seven leading capitalist countries in Ottawa (July 1981) the U.S. President demanded that his partners sharply curtail economic relations with the USSR. At that time the United States achieved agreement for the discussion of the issues of trade with the Soviet Union at the summit level within COCOM. Here the leadership of the United States is constantly expressing the opinion that the coordinating committee should be invested with the broader functions and powers of an international trade policy organ.

Similar issues were raised at a series of subsequent conferences in 1982 and 1983. At them, in spite of stubborn resistance on the part of the West European countries and Japan, the United States was able to get from its allies obligations on the further strengthening of the international system of

the control of the export of "strategic goods" to the socialist countries, as well as the taking of national steps for similar purposes.

Thus, since the Reagan Administration took office, the economic relations of the United States with the USSR and the other socialist states through its fault have been aggravated significantly. The unilateral imposition of discriminatory restrictions on trade with the Soviet Union and its use for political and military economic purposes led to the curtailment of commercial, economic, scientific and technical relations between the USSR and the United States. All these discriminatory measures, which are being implemented by the Reagan Administration with the consent and support of Congress, testify to the aspiration of Washington by means of the mechanism of export control to exert political pressure on the socialist countries, to check their economic, scientific and technical development and to achieve in this way military and technical superiority over the USSR.

However, such attempts of the American militarists are futile. Life itself refutes them. The socialist countries, having a mighty economic, scientific and technical potential, are capable of accomplishing independently all the tasks facing them. As General Secretary of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet Comrade K. U. Chernenko stated, "we will henceforth be concerned about strengthening the defensive capability of our country, so that we would have adequate means by which it is possible to cool the hot heads of the militant adventurers."

FOOTNOTE

1. According to American terminology, any scientific and technical achievements in various sectors of industry, which can be used for the output of products for military purposes, are grouped with "critical technologies." The control of its export also applies to goods, in accordance with which such technology can be revealed by "reverse designing."

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SOCIO-POLITICAL FACTORS

SOCIAL FACTORS OF SCIENTIFIC, TECHNICAL PROGRESS IN INDUSTRY

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 8, Aug 84 pp 55-61

[Article by Candidate of Economic Sciences S. Vovkanich (Lvov): "An Attempt at the Study of the Social Factors of Scientific and Technical Progress at Industrial Enterprises"]

[Text] The conditions, under which the national economy will develop in the 1980's, it was stressed at the 26th CPSU Congress, are making more and more urgent the acceleration of scientific and technical progress as the basis of the rapid changeover of the economy to the means of intensive development and the increase of the efficiency of social production and the well-being of the Soviet people. Special emphasis was also placed on the importance of this assumption in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (1983). The party is constantly directing the attention of scientific research and planning and design organizations and production associations (enterprises) to the more effective search for and the complete use of reserves by means of the extensive and rapid introduction in production of the achievements of science and technology and advanced know-how. In this connection the need is arising for the comprehensive study of the factors which are influencing the directions and pace of scientific and technical progress at the present stage.

In the report of K. U. Chernenko at the June (1983) CPSU Central Committee Plenum the task was posed for economists, sociologists, psychologists and lawyers to study more actively and to analyze more thoroughly the essence of the socioeconomic processes which are occurring under the conditions of mature socialism for the purpose of their consideration in the practice of social planning and control at all levels. Under these conditions much will depend, as was stressed at the December (1983) CPSU Central Committee Plenum, on how "...we mobilize the collectives of enterprises and scientific research and design organizations, engineering and technical personnel and scientists for the acceleration of scientific and technical progress. This is a task of paramount importance."

The acceleration of scientific and technical progress is a complex problem. In its solution social factors are becoming more and more significant. Consequently, labor collectives should direct their attention "...to the

implementation directly at enterprises and associations to the fullest the ideals and principles of the socialist way of life."[1] The improvement under the conditions of socialism of the personal factor of production implies the development of man as the basic subject, in whose name scientific and technical progress is being launched, all transformations are being implemented and the innovative activity of labor collectives is being linked with them. At this stage of the development of social production their role in the acceleration of scientific and technical progress is increasing. This is reflected in "The Law on Labor Collectives and the Increase of Their Role in the Management of Enterprises, Institutions and Organizations." When planning the technical and economic indicators of the operation of production associations (enterprises) more and more attention is being devoted to the social program of the development of their labor collectives.

In our opinion, the certain inertia in the implementation of social factors to a significant extent is due, first, to their narrow understanding, in case of which it is difficult to accurately determine quantitatively the influence of these factors. Social (sociological, sociopsychological, socioeconomic and other) research is still hardly being conducted for their comprehensive and thorough study and the sociological services of enterprises and organizations are still hardly being enlisted for this, the public opinion of collectives, without which the identification of these factors frequently is simply impossible, is being inadequately studied.

Second, in the social sciences (sociology, political economy, in part in social psychology) scientists have focused the basic attention on the social consequences of scientific and technical progress. As a result the impression has been formed that scientific and technical progress originates and develops regardless of social processes, giving rise only to social consequences. In reality the complex dialectics of the technical and the social in the acceleration of scientific and technical progress, objective prerequisites and subjective factors occurs here.

Consequently, the reason that the proper status up to now has not been granted to the social factors of scientific and technical progress, is the poor elaboration of the methodological and procedural principles of their study. The extension of the practice of using the methods of sociology[2] for determining the social factors of scientific and technical progress in industry and the sociological analysis of their role and use would facilitate the development of a unified procedural approach to the understanding and classification of the factors of scientific and technical progress as a whole.

It should be noted that attempts at the classification of these factors have been made in the literature. Having generalized this research, for example, in the direction of the personal factors of the acceleration of the implementation of scientific and technical research, it is possible to distinguish: training and experience; individual personality traits; the forms of communication; organizational actions; the goal orientation; motives.[3] However, such a classification is insufficiently complete, since the examination of the factors only at the level of the separate individual narrows their understanding and limits their study from the standpoint of development as a process in general. Marxist-Leninist sociology aims at the

study of all social processes and phenomena in their combined interconnection and interdependence.

From the point of view of these methodological positions the cause of the development of any process and phenomenon is first of all its internal contradiction, which acts as a stimulus of self-movement and self-development. Internal contradictions between science and technology are characteristic of scientific and technical progress. The dialectics of their interconnection finds expression, on the one hand, in the intensifying process of the scientification of technology and, on the other, in the industrialization of science through applied research and more perfect technical tools. In any contradiction there are its leading link and its opposite. Man, who accumulates advanced know-how, labor skills and new knowledge and improves his own needs and abilities and the needs of society, plays the role of such a link in the acceleration of scientific and technical progress. While fulfilling social "orders," man also resolves the mentioned contradictions between science and technology. In this connection the list of social factors of the acceleration of scientific and technical progress can be quite broad. They operate and, consequently, can be studied at different levels, that is, on the level of society, the territorial community, the collective and the individual worker. Just as the other concepts, before which the word "social" stands (control, information, monitoring and so on), they are used in the broad and narrow sense of this word. Therefore it is necessary first of all to delimit the concepts of these factors and to differentiate them into factors of the first and subsequent orders. In case of the broad approach we group with social factors all (technical, economic, organizational and other) factors of scientific and technical progress, for they are connected with the activity of man, his mind and labor.

On the basis of the cited general methodological premises and taking into account the works of Soviet researchers, it is possible to single out two groups of factors of the acceleration of scientific and technical progress: the direct (sources) and the mediated (motive forces). The factors, which directly influence the emergence and development of the scientific and technical revolution, pertain to the sources of scientific and technical progress. These are science as a direct productive force, the education and the increase of the skills level of personnel, their creative scientific and technical work, the introduction of innovations, the information support of the collective and so on. Sources are, according to the claims of a number of authors, "what is done" by the process.[4] Scientific and engineering labor of a creative nature, that is, labor which is connected with the formation and assimilation of innovations, with the innovative scientific, technical and efficiency activity of the collective and with the heuristic approach and experimenting, holds a special place among them.

The factors, the effect of which is mediated by the system of sources of the acceleration of scientific and technical progress, belong to the motive forces of scientific and technical progress. These are social activeness, the unity of the public and private interests of the working people, a planned nature and unity in the pursuit of technical policy, social needs and orientations, stimuli and motives and others. Although they do not improve directly either the tools of labor or the experience of production workers, they do play the

role of factors, which direct the processes of the internal development of productive forces, and increase the activeness of the collective in scientific and technical activity and the other social characteristics, which are inherent in the labor collective. In other words, the motive forces are that which "forces one to make" scientific and technical progress and promotes its acceleration.

Among the motive forces production relations, which act as motive factors, perform the main function. Under the conditions of socialism the system of management with its social form of ownership of the means of production has advantages in the acceleration of scientific and technical progress owing to the concentration of resources on its basic directions, the activeness of the broad masses of working people and others. Here the factors of scientific and technical progress act as social indicators of the advantages of socialism in the implementation of scientific and technical achievements. Socialist production relations give rise to the collective cooperation of people, who are united by common goals and interests, contribute to the development of collective forms of creativity, socialist competition and and creativity as a whole and have a positive influence on the motivational structure of the activity of the labor collective. The labor process and a creative attitude toward it are acting more and more as a form of the self-expression of the individual and the self-realization of his spiritual powers and creative possibilities. The cited groups of factors of scientific and technical progress are specified and made subjective in the collective, being refracted through the prism of the activity of the individual worker. Here the motive force acquires the form of an internal motive or an external stimulus. And if it is a question of the fundamental advantages of socialism in the use of the achievements of scientific and technical progress, the direct participation of labor collectives in the extensive introduction of scientific and technical achievements in the national economy, the mass creative scientific and technical work of the working people, the strengthening of the ties of production with large-scale science and others first of all are their source.

The social factors of scientific and technical progress at the level of labor collectives and the activity of plant scientists, engineering and technical personnel and leading workers act in the narrow sense as factors of their creative labor. In this case some scientists group with them the scientific status, for example, of a plant scientist, the organization of his labor and relaxation, the increase of the general educational and occupational level of workers and so on.[5] This list is not complete, since neither the factors of communication, motivation and the moral and psychological climate nor other, as well be shown below, important strictly social and sociopsychological factors of the creative labor of the member of a collective on the acceleration of scientific and technical progress are included here.

Consequently, the social factors of the acceleration of scientific and technical progress in the narrower sense of the word are connected with the development of the intellectual (spiritual), psychological and physical potentials of the worker for the development of new scientific and technical knowledge, advanced methods, as well as the conditions for their implementation and reproduction. In this sense they act as social factors which are connected entirely with the all-round development of man. Often

under the conditions, when "technicism" dominates in the interpretation of the factors of scientific and technical progress, the group of social factors of scientific and technical progress as such in general is also confined to the narrow sense, although the latter are the broadest concept. One should agree with the opinion that scientific and technical progress "...always has a social and, hence, a political basis."[6] From such a standpoint it is equally important, how equal scientific and technical progress in its social essence is to the tasks and goals of all members of society and how thoroughly the advantages of the social system are used for its acceleration.

Labor collectives (especially production collectives) as the basic units of society can use actively and thoroughly the function of the subject of the planning of their development on the basis of the comprehensive approach. At present the acceleration of scientific and technical progress is governed not only by the achieved level of the material and technical components of production, but also by the degree of development of man as the basic productive force and by the level of the conditions, which contribute to the manifestation of his spiritual and creative potential.

At the present stage of the development of productive forces the living "embodied knowledge," which is materialized both in technically advanced machines and in the scientific and technical training of people and the ability to think creatively, to use advanced domestic and foreign know-how and to make decisions for the purpose of the further acceleration of scientific and technical progress, is playing an important role. Therefore the identification and use of the social factors of the acceleration of scientific and technical progress envisage the consideration of the qualitative changes in productive forces at the present stage and first of all the changes, which are connected with the increase of the creative potential of man, his all-round development, his attitude toward labor and so on. On the procedural level the study of the social factors of scientific and technical progress in the practice of socioeconomic planning results from these changes. Therefore at the first stage of research it was necessary to make a context analysis of the plans of the social development of the collectives of enterprises. Since these plans were drawn up at the enterprises of Lvov with our methodological support and in accordance with unified methods,[7] precisely they also underwent an analysis, which showed irregularity in the planning of measures on the use of the social factors of scientific and technical progress at each of them. However, it was possible by such a means to specify in advance a portion of the factors which were taken into account to one extent or another in the practice of social planning.

The advantages of socialism in the available social factors of the acceleration of scientific and technical progress are indisputable. But not all the units of the economic mechanism have yet been developed so that they could automatically realize these advantages.[8] Therefore at this stage the task consists in the most complete use of the entire set of factors of the acceleration of scientific and technical progress.

With respect to the spread of the mistaken opinion that the acceleration of scientific and technical progress will occur by itself, the absence in economic literature of a clear delimitation between the concepts "factor" and

"condition" contributed to this. An equal sign is often placed between them, although these concepts, in our opinion, are not synonymous. One must not identify them, since conditions are potential factors, which become them strictly speaking only in the process of the activity of man. The peculiarity of conditions consists in the fact that they cannot yield results by themselves (without activity). On this level social reserves seem to us like the difference between the conditions and factors of this type of activity or process. The indisputable advantages of socialism in the acceleration of scientific and technical progress are the favorable conditions for its further development. They are becoming factors and are being realized in the active daily innovative work of the scientists, engineering and technical personnel, leading workers and efficiency experts of the enterprise and its entire collective. The orientation toward the increase of the responsibility for the introduction of innovations and the increase of the labor discipline of all the participants in the "science--production" process is a requirement of the times, which is connected with the settlement of legal questions. All this is responsible for the comprehensive approach to the factors of scientific and technical progress as a complex system of the determination of this objective socioeconomic process, the pace of which is distinguished by the interaction of the sources and motive forces, the skillful use and combination of their role at every stage.

The use in the study at the second stage of the program of the method of the expert survey along with the methods of the gathering and analysis of documentary information not only made it possible to specify the set of social factors of scientific and technical progress, which, in the opinion of specialists, should be taken into account without fail in the practice of planning, but also made the ranking of factors possible (see Table 1). The generalization of the opinion of 75 experts--specialists in the problems of the economic, scientific and technical and social development of enterprises--confirmed the hypothesis that the cited basic blocks of factors (sources and motive forces) in case of further detailing can be divided into specific subtypes of factors of a second order, which, although interdependent, act relatively independently. Thus, the basic factor "science as a direct productive force" under the conditions of the enterprise is expressed by the following components: the development of creative ties with scientific centers (the Academy of Sciences, the Ministry of Higher and Secondary Specialized Education, ministries); the formation of the plant sector of science; participation in the intersectorial special-purpose scientific production complexes of the region; the stepping up of the participation of the collective in the work of public scientific and technical organizations (scientific and technical societies, the All-Union Society of Inventors and Efficiency Experts and others). Each of the listed factors, in turn, results from the mechanism of the social activeness (cognitive, labor, sociopolitical) of the collective and the individual, from their need for the creative solution of production problems and the obtaining for this of new scientific information, from the sociopsychological readiness for the introduction of innovations; from the attitude of the collective (individual) toward scientific activity and the settlement of vital questions of production on the basis of intensive factors of development (the increase of skills, the implementation of the new achievements of science and technology, advanced know-how and others).

Table 1

Breakdown of Social Factors of the Acceleration of Scientific and Technical Progress by Ranks (total of points on the basis of an expert appraisal)

Factors	Number of points	Absolute rank
Study and use of advanced production know-how of related enterprises	268	1
Participation of workers is creative scientific and technical work	266	2
Purposefulness and creative activeness of efficiency experts and inventors	260	3
Socialist competition on the acceleration of the introduction of scientific and technical achievements	256	4
Degree of information of the collective about foreign scientific and technical achievements	250	5
Readiness for updating of the technological process	240	6
Ability (creative potential) of the collective to accomplish the tasks on the acceleration of scientific and technical progress	234	7
System of evaluation of the creative contribution of workers to the acceleration of scientific and technical progress	233	8
Material stimulation of participants in the acceleration of scientific and technical progress	232	9
Introduction of innovations on the organization of labor	228	10
System of social planning at the association	225	11
Material stimulation of participants in the acceleration of scientific and technical progress (individual)	224	12
Moral stimulation of participants in the acceleration of scientific and technical progress	217	13
Readiness for carrying out experimentation	215	14
Introduction of innovations on production management	215	15
Concern about creative reserve of the association	210	16
Sociopolitical activeness of labor collective	207	17
Contact of association with scientific centers	204	18
Interest of workers in innovations (creative enthusiasm)	201	19
Development of plant sector of science	199	20
System of the increase of occupational knowledge and advanced training of personnel	196	21
Labor discipline	195	22
Sociopsychological readiness of the collective for innovations on questions of the organization of labor and management	189	23

[Table continued on following page]

Table 1 (continued)

Factors	Number of points	Absolute rank
Personal creative motives of individual specialists	186	24
Sociopsychological climate of the collective	185	25
System of selection and placement of personnel	178	26
Participation of workers in production management	177	27
Introduction of innovations with the improvement of equipment and technological processes	172	28
Educational and skills level of workers	159	29
Training and orientation of workers toward creative research	155	30
Stabilization of the production collective	112	31

The study showed that the need for an individualized approach to the social factors of the acceleration of scientific and technical progress is connected with the different manifestation of their effect at different levels. For example, if it is a question of the efficiency of the creative labor of the individual scientist, here such factors as the level of his skills, personal qualities (talent, motives of labor, the tendency of the personality and so on), a responsible, creative attitude toward labor and others play a large role. However, at present collective forms of creativity dominate. The time of scientists who work alone has passed, now they work in collectives and the level of their creative labor depends in many ways on the style and level of management, the stability and cohesion of these collectives, the moral and psychological climate in them, the coincidence of the creative interests of the members of the collectives and other factors.

When examining the social factors of the acceleration of scientific and technical progress at the level of the individual, it is necessary to single out specially among them the sociopsychological factors. Their study makes it possible to understand more thoroughly the mechanism of the formation of the social activeness of the participants in the acceleration of scientific and technical progress and to show the great role of the need of man for creative activity. This need influences the attitude of man toward labor and knowledge and prompts him to active participation in the affairs of the collective. From the need through the development of the system of motivation to a specific type of social activeness--such should be the path of the development and increase of the activeness of the collective and its workers. The factor of the motivation of creative activity characterizes the structure of the stand of the individual (value precepts, the level of demands, interests, social orientation). The problem of the stimulation of the creative behavior of a person and his direct participation in scientific and technical progress acts as a dialectically interconnected aspect of the elaboration of the structure of motivational factors.

Thus, the social factors of the acceleration of scientific and technical progress are, first, a very complicated formation, which has sociopolitical, sociological and sociopsychological aspects. Second, the change of the

connection in the "science--technology--production" system inevitably leads to the change of the influence of the existing social factors of the acceleration of scientific and technical progress and the appearance of new ones. Only the systematic and thorough study of social processes and phenomena and public opinion, as was noted at the June (1983) CPSU Central Committee Plenum, makes it possible to identify the most significant factors and to study their interrelations and interdependences for the purpose of consideration in the current activity of labor collectives and the planning of their economic and social development for the future. For this a center for the study of public opinion of the institute of sociological research attached to the city committee of the Ukrainian CP was set up in Lvov on the recommendation of sociologists. The center is conducting research in conformity with the third stage of the program at more than 10 enterprises and associations of the city (the Lvov Bus Works, the Mikropribor Production Association, the Svitoch firm and others).

Table 2

Factor Checking the Development of the Creative Activity of Engineering and Technical Personnel

Factors	Rank distribution of factors (by relative rank) at enterprises							
	1	2	3	4	5	6	7	8
Inadequate theoretical training	4.5	6.0	8.0	7.5	6.5	6.5	8.0	4.0
Little practical experience	4.5	2.0	5.0	6.5	3.0	6.5	5.0	3.0
Lack of suitable conditions (performers) for use	2.2	3.0	4.0	4.5	4.5	5.0	2.5	2.0
Lack of necessary information	1.0	6.0	3.0	3.0	3.0	2.0	1.0	1.0
Being busy during working time with matters not appropriate to official duties	2.5	1.0	1.0	1.0	1.0	3.5	6.5	5.0
Low scientific level of the organization of labor	7.5	4.0	2.0	2.0	4.5	2.0	2.5	7.0
Poor assistance of management	7.5	8.0	6.0	6.0	8.0	8.0	6.5	7.0
Insufficient opportunity to consult with leading specialists (leaders) in the given direction of scientific and technical progress	6.0	6.0	7.0	4.5	6.5	3.5	4.0	6.0

Key:
1. Svitoch firm
2. Progress Production Association
3. L'vovkhimsel'mash Production Association
4. Bus Works
5. Milling Machine Plant
6. Mikropribor Production Association
7. L'vovdrevprom Production Association
8. Promin' firm

The processing of the preliminary data on eight objects of the study has been completed. There is no possibility to dwell here in detail on the results of the generalization of the opinion of the labor collectives and the elaborated procedural recommendations with respect to the use of one factor or another at a specific enterprise. Let us cite only several of them. Here is what, in the opinion of engineers, is checking, for example, their creative activity on the acceleration of scientific and technical progress (see Table 2). An overwhelming portion of the specialists are discontent with the level of information support, although it is well known that information is an object and product of engineering labor. Thus, to the question: "Are you informed about foreign scientific and technical achievements in the sphere characteristic for you?" only 25.3 percent of them responded affirmatively; 50.5 percent responded that they know them in part, while 21.7 percent responded that they do not know them.

To a significant extent these problems are being solved by the organization at the Western Scientific Center of the Ukrainian SSR Academy of Sciences of intersectorial special-purpose scientific production associations (MTsNPO's), which are a new progressive direction of the formation of the system of management of scientific and technical progress in the region.[9] But the organization of the creative ties of production workers with scientists by direct information contacts (seminars, conferences, business consultations, probationary work and so on) and informal communications channels on questions of scientific and technical progress of the region requires more attention.

Socioeconomic criteria and indicators of the evaluation of the creative potential of the region, which take into account the specific nature of the performance of scientific research, planning and design and other operations of the "science--production" cycle in the academic sector of science, the sector of science of higher educational institutions and the plant and public sectors of science, were developed in the process of studying the social factors of the acceleration of scientific and technical progress. This made it possible to determine the approximate thematic potential of the region for the elaboration of a specific direction of the development of scientific and technical progress in the region and the "leaders" of these problems not on the basis of the resource understanding of the potential, but from the standpoint of goal-oriented activity.

At the present stage in the development of the creative potential of the region a significant place belongs to the developed plant sector of science, which acts as a kind of link which connects and integrates such large and relatively independent systems as science and production. From the standpoint of the social orientation of the factors of scientific and technical progress this is a qualitatively new reality in the process of the contact of science with production, which reflects the highest stage of the organization of social production and the new structure of productive forces under the conditions of mature socialism.

The increase of the creative potentials of the individual, the dynamics of innovations and the role of collective forms of creativity requires the increase of the activeness of all workers of the modern enterprise in the direction of the promptness of the reaction to new scientific ideas and

psychological readiness for their implementation. In the process of innovative activity the sociopsychological structures of collectives become complicated, which requires not only the creation of a favorable moral and psychological climate, the management of adaptation processes, the decrease of the sociopsychological barriers before the introduction of what is new and the study of the value orientations and needs of the workers: the improvement of the system of moral and material stimulation is of no less great importance. It is well known that the introduction of something new always involves a risk and the disharmony of production, it, as a rule, affects the fulfillment of the plan. Therefore, as was noted at the November (1982) CPSU Central Committee Plenum, it is necessary to strive for such a state of the matter "...so that those, who boldly agree to the introduction of new equipment, would not find themselves in a disadvantageous situation."

The display of the entire set of social factors of scientific and technical progress requires the continuation of their study on the theoretical and practical levels and the more intensive attraction of specialists of various kinds. No matter what spheres of the vital activity of the labor collective are examined (from the standpoint of either its present or future development), the acceleration of scientific and technical progress is always the main question. Being a continuous process, scientific and technical progress is now acquiring new features, which are appearing in the innovative cycle "science--production--consumption" itself and in the increase of both its social orientation and its social conditionality. Man, while changing under the influence of scientific and technical progress, act as not only an object, but also an active subject of its acceleration and its management as a whole.

For the improvement of the system of the management of scientific and technical progress and the use of the social factors of its acceleration one should use more extensively the methods of industrial sociology, which have shown themselves to be an effective means of feedback in the practice of social management and planning at various levels. The consideration in the management of scientific and technical progress of the analyzed factors of its acceleration will contribute to the increase of the social activeness of labor collectives on the use of the results of the labor of scientists and designers.

FOOTNOTES

1. V. V. Shcherbitskiy, "Nauchno-tekhnicheskiy progress--zabota partiynaya" [Scientific and Technical Progress Is a Party Concern], Kiev, Politizdat Ukrainy, 1983, p 27.

2. Concrete sociological studies were conducted at the industrial enterprises in three stages in accordance with a specially developed program. Various methods of gathering information were used here: the study of documents and their content analysis, the survey of experts and the survey of engineering and technical personnel, efficiency experts and production innovators. The survey was conducted with a sufficiently representative

sample, which comes to 10 percent of the size of the general population. The processing of the questionnaires was carried out on computer.

3. V. N. Kushlin, "Uskoreniye vnedreniya nauchnykh dostizheniy v proizvodstvo" [The Acceleration of the Introduction of Scientific Achievements in Production], Moscow, "Ekonomika", 1976, 176 pages.

4. See "Istochniki i dvizhushchiye sily nauchno-teknicheskogo progressa" [The Sources and Motive Forces of Scientific and Technical Progress], Leningrad, Izdatel'stvo LGU, 1978, 176 page.

5. See V. N. Kushlin, Op. cit.

6. See V. V. Shcherbitskiy, Op. cit.

7. See "Razrabotka planov ekonomicheskogo i sotsial'nogo razvitiya g. L'vova i yego administrativnykh rayonov" [The Drafting of Plans of the Economic and Social Development of the City of Lvov and Its Administrative Rayons], Lvov, 1980, 76 pages; "Organizatsiya planirovaniya sotsial'nogo razvitiya kollektiva proizvodstvennogo ob"yedineniya (predpriyatiya)" [The Organization of the Planning of the Social Development of the Collective of the Production Association (Enterprise)], Lvov, Izdaniye L'vovskogo gorkoma Kompartii Ukrainy i IE AN USSR, 86 pages. These recommendations were elaborated with the participation of workers of the Lvov Department of the Institute of Economics of the Ukrainian SSR Academy of Sciences.

8. See O. S. Yemel'yanov, "Udoskonalennya sotsialistychnogo gospodar'skogo mekhanizmu na suchasnomu etapu" [The Improvement of the Socialist Economic Mechanism at the Present Stage], Kiev, Politvidav Ukrayiny, 1982, 76 pages.

9. See M. G. Chumachenko, M. M. Yermoshenko, "The Scientific Organizational Principles of the Formation of the System of Management of Scientific and Technical Progress in the Region," VISNIK AN URSR, No 1, 1983, pp 63-75.

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GENERAL

UKRAINIAN ACADEMY OF SCIENCES PRESIDENT ON SCIENTIFIC, TECHNICAL PROGRESS

Kiev KOMMUNIST UKRAINY in Russian No 10, Oct 84 pp 54-65

[Article by President of the Ukrainian SSR Academy of Sciences B. Ye. Paton: "Scientific and Technical Progress: Current Trends and Prospects"]

[Text] The changeover to the intensive development of the national economy is possible only on the basis of the mass implementation of the achievements of the scientific and technical revolution and profound changes in the equipment and technology of social production.

Our party has always attached exceptionally great importance to the formulation and pursuit of an advanced scientific and technical policy and has linked the tasks of the development of science and the mastering of the latest equipment and technology most closely with its program goals. It is well known that V. L. Lenin called the plan of the State Commission for the Electrification of Russia the second program of the party.

The fundamental combination of the achievements of the modern scientific and technical revolution with the advantages of the socialist social system is essentially a task of program importance. "The idea of merging the two revolutions--the scientific and technical and the social--should receive suitable reflection in the CPSU Program," General Secretary of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet Comrade K. U. Chernenko said at a meeting of the Commission for the Preparation of a New Version of the CPSU Program.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," which was adopted in August 1983, is an important document which specifies the present strategy in the area of science and technology. It envisages the radical revision of the entire set of organizational, economic and other measures on the broadening of basic research, the development on this basis of advanced processing methods and new equipment, the increase of the scale and the shortening of the time of their practical use in the national economy.

The decree of the CPSU Central Committee and the USSR Council of Ministers has been clarified with reference to the conditions of our republic. A detailed

program of actions on the acceleration of scientific and technical progress, the concentration of efforts on the accomplishment of the tasks of the intensification of production and the increase of its technical level has been specified.

The establishment under the auspices of the Ukrainian CP Central Committee of the Council for the Promotion of Scientific and Technical Progress, which Member of the Politburo of the CPSU Central Committee and First Secretary of the Ukrainian CP Central Committee Comrade V. V. Shcherbitskiy heads, was a vivid display of party concern for the acceleration of scientific and technical progress in our republic. This authoritative organ has extensive powers in matters of the establishment of effective scientific and technical cooperation, the overcoming of departmental barriers and the elimination of everything that hinders the further development of scientific research, the more efficient use of the achievements of scientists and the technical updating of production in the republic. With its establishment the outlines of a well-balanced and effective system of the management of scientific and technical progress took shape in the Ukrainian SSR.

The decrees, which were adopted by the CPSU Central Committee and the government, afforded extensive prospects for the further increase of the contribution of science to the accomplishment of the tasks of building communism.

The success of this work on the acceleration of scientific and technical progress is governed by two basic factors. First, by the broadening and intensification of basic and applied research. Second, by the resolute improvement of the mechanism of introducing the results of scientific research in operating production and by its backing with the appropriate stimuli. It is important that this mechanism would ensure the great effectiveness of scientific and technical cooperation. Today the fullest consideration of the noted factors is a decisive prerequisite of the increase of the growth rate of the national income and labor productivity and of the successful solution of the urgent economic and social problems of the society of mature socialism.

The work on the development and adjustment of an efficiently operating mechanism of the management of scientific and technical progress, which ensures its constant acceleration, is an extremely important and responsible matter. But progress itself and its content are even more important. The latter is inseparable from the development of basic and applied research, which are an inexhaustible source of the forward movement of science, technology and production and the development of society as a whole.

Basic research has traditionally held a central place in the activity of the Academy of Sciences. However, under the conditions of the modern scientific and technical revolution, which has accelerated by many times the progress both of science itself and of production, which acts as its "technological application," it is impossible to separate the search for new scientific knowledge from its practical use. The separation of one from the other inevitably dooms technical innovations to obsolescence and is responsible for the overall decrease of the pace of scientific and technical progress. Therefore the high level of basic research should be combined with a clear

idea of the possibility of using the results being obtained and, of course, should be backed by persistent work on their practical implementation.

With the development of the productive forces of society the objective dependence of the further progress of physical production on the materialized final products of science: new technological processes, models of industrial equipment, automated control systems, machines, instruments, components, energy carriers and materials with preset properties, is steadily increasing. This entire extensive set, which is constantly being enriched, of methods and means, by which society creates the material conditions of its existence and development, is encompassed by the extremely broad concept of modern technology.

The development of processing methods requires a massive scientific basis, and this circumstance is acquiring a regular nature under the conditions of the scientific and technical revolution. Empiricism with its characteristic element of chance cannot serve as a reliable foundation of modern technology, especially with allowance made for the increasing effect of the time factor.

Modern technology is a kind of bridge, which connects scientific theory with the practice of social production. A scientific discovery begins to serve society properly when it obtains real embodiment in technology. Therefore the development on the basis of basic research of fundamentally new processing methods, which ensure radical changes in production, is the main unit of modern scientific and technical progress, a key factor of its acceleration and the most adequate form of the complete implementation of its results in the national economy.

The more and more distinct orientation of theoretical and experimental research toward the accomplishment of practical tasks, first of all of a technological nature, is becoming the dominant trend of the development of world science. It, of course, also received reflection in the activity of the Ukrainian SSR Academy of Sciences, which for a long time now has been pursuing a policy of the assurance of the fundamental connection of research with the vital needs of the national economy and economic and social progress. An active position on questions of the practical implementation of the results of scientific research is characteristic of the creative collectives of the academy.

The activity of the Ukrainian SSR Academy of Sciences on the increase of the effectiveness of scientific research, the shortening of the time of the introduction of its results in practice, the development on the basis of basic research of highly efficient processing methods, as well as on the accomplishment of the tasks of the Food Program in the past 10 years has been endorsed three times by the CPSU Central Committee.

The Presidium of the Ukrainian SSR Academy of Sciences and its institutes have outlined effective steps, which are aimed at the improvement of the goal program planning of research and introduction, the strengthening of the experimental design and production base of the academy, the development of the forms of cooperation of scientists and production workers and the utmost

stepping up of the efforts on the assurance of the extensive rapid introduction of scientific and technical achievements.

At the Ukrainian SSR Academy of Sciences theoretical and experimental research is being conducted in more than 200 urgent scientific directions. Scientific research and experimental design work is being performed within the framework of 135 union and republic scientific and technical programs, as well as in accordance with comprehensive plans with 20 ministries and departments of the country and in accordance with 64 regional goal programs. In 1983 more than 1,350 works with a total economic impact of 1,055,000,000 rubles, in which the share of the academy exceeds 595 million rubles, were introduced in the national economy.

In recent years scientists of the academy have developed more than 350 processing methods of different levels and for different purposes, which are being used in the sectors of the national economy. In particular, the technologies of the production of new types of large-diameter pipes, which were developed at the Institute of Electric Welding imeni Ye. O. Paton, as well as a wide range of technological processes of their field welding when laying heavy-duty main pipelines are of great national economic importance. Thorough research in such areas as the metallurgy of ferrous metals, solid state physics and the mechanics of destruction was the theoretical basis of these developments.

The basic research in the area of computing mathematics and theoretical cybernetics, which was conducted at the Institute of Cybernetics imeni V. M. Glushkov of the Ukrainian SSR Academy of Sciences, made it possible to develop the macropipeline principle of the organization of the computing process and to develop the technology of the designing and production of multiprocessor recursive computers, which have a superfast operating speed.

The technologies of the dynamic hot molding of high-strength powder items, which were developed at the Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences, have acquired wide renown in the country. Efficient production lines have already been introduced at a number of plants. The tool services of many enterprises have been supplied with high quality tools which were developed by scientists of the Institute of Superhard Materials of the Ukrainian SSR Academy of Sciences. A unique "family" of adhesive compounds like Sprut, which were synthesized by scientists of the Institute of Chemistry of High Molecular Compounds of the Ukrainian SSR Academy of Sciences, is being used successfully in various sectors of the national economy.

Under the conditions of the present stage of the scientific and technical revolution the development first of all of such processing methods, which ensure the accomplishment of production tasks of the intensive type, is natural. The changeover of the economy to the path of intensification requires the increase of the production volumes without the corresponding increase of the amounts of resources of all types, which are being committed to the national economic turnover. But this is impossible without the development and industrial assimilation of a wide range of resource-saving processing methods, which make it possible to decrease substantially the

expenditures of raw materials, energy, fuel and lubricants and working time on the production of a unit of output and to improve the indicators of the use of equipment. Such processing methods also make it possible to solve the problems of the efficient use of natural resources and the decrease and elimination of ecological damage.

Only the latest processing methods can serve as a reliable basis of the modernization of production and its retooling. Modernization provides a large saving on financial, material and labor expenditures and makes it possible to promptly bring the fixed capital and the functional structure of operating production in line with the latest achievements of science and technology. The extensive automation of technological processes, the use of automated machine tools and devices, standardized modules of equipment, robotic complexes and computer equipment and the development of versatile automated production systems act as the main content of all the work in this direction.

The need for the "technological orientation" of major scientific forces, which reflects the objective law of the change of science into an immediate productive force, is giving rise to the tendency toward the fusion of theoretical and experimental research with applied development and is leading to the emergence of research of a fundamentally new class--goal-oriented basic research.

Research of this sort is a dictate of the times. It is succeeding the traditional forms which are characteristic of what is called "pure" science. While being in no way inferior to the latter in fundamentality and depth, it is immeasurably more effective. It is not by chance that such most important problems as thermonuclear fusion, the opening up of space and the development of space technologies and the development of electronic computer technology from the very start required goal-oriented research. At the present stage the process of transforming this research from an isolated into a universal phenomenon is beginning.

Domestic experience and the experience of foreign countries convince us that the success of basic research is directly dependent on its transformation into goal-oriented research. It is governed not only by the influence which research has on the course of the development of science itself. Genuine success comes when its results are materialized in social practice--in equipment and production technology, in the sphere of socioeconomic relations. Therefore progress in the area of physical production depends to an even greater degree on the transformation of basic research into goal-oriented research.

By making it possible to take much more completely into account the dialectics of the interaction of science and production, goal-oriented research conforms to the greatest extent to the needs of the intensive development of the national economy. It makes it possible to concentrate significant scientific forces on the key problems of modern production and to fundamentally combine theoretical, experimental and applied tasks within the research cycle with unified planning, financing and manpower, material and technical supply. Its main advantage is that at all stages of its conducting it is oriented toward obtaining end results in the form of major technological decisions.

At the Ukrainian SSR Academy of Sciences there are many examples of the successful conducting of goal-oriented basic research and the development on its basis of fundamentally new processing methods in the interests of the key sectors of the national economy--metallurgy, machine building, the fuel and power complex, large-scale chemistry. The thorough study of the physical chemical processes in metals and the kinetics and mechanism of the processes in molten metals and melted slags over a wide range of temperatures concluded with the development of the electroslag processing method, which has received world recognition. This processing method became the basis of the development of such special technological processes as electroslag remelting, casting, surfacing and welding and marked the beginning of a new sector of industry--special electrometallurgy. The research in the area of the physical chemistry of metallic and nonmetallic materials, which are condensed in a vacuum, the space technology of metals and others has been marked by significant successes. At the institutes of the Ukrainian SSR Academy of Sciences of the material science type basic research in many cases has already become goal-oriented.

This process has also encompassed other scientific directions. Thus, for example, scientists of the institutes of physics, semiconductors and nuclear research of the Ukrainian SSR Academy of Sciences performed comprehensive studies of the effect of nuclear radiation on semiconductors. A new technology of improving the properties of the control of the parameters of solid-state semiconductor instruments was developed on their basis. The goal-oriented work in the area of mechanics and mathematics led to the formation of an important scientific direction--technological thermodynamics, the development of which contributed to the optimization of a number of technological processes in machine building and instrument making.

The rapid development of goal-oriented research is also having a more and more noticeable influence on the organizational structure of science itself. The traditional structure of academic institutes was formed under the decisive influence of "pure" science, when basic research and the technological application of its results were dispersed in time and space. Goal-oriented basic research required a new structure of scientific institutions, which corresponds to its content and tasks.

Interesting experience already exists here. Those institutes of the Ukrainian SSR Academy of Sciences, which have been developing goal-oriented research over a long period, acquired considerable organizational structural uniqueness. They have, in essence, already been transformed into large scientific and technical complexes, which have within them in addition to the institutes proper also technological design bureaus, pilot experimental works and pilot plants. Experience shows that the scientific and technical complexes in the system of the Ukrainian SSR Academy of Sciences are an adequate organizational form of the conducting of goal-oriented basic research and ensure a high readiness of scientific developments for introduction on a wide scale. They create favorable conditions for the intensification of scientific research, the sharp increase of the quality of developments in the interests of the sectors of the national economy, the increase of quality and the substantial shortening of the time of their practical implementation.

The highly efficient technology and sets of single-design equipment for the butt resistance welding of heavy-duty main pipelines, which, in particular, were used successfully on the route of the Urengoy-Pomary-Uzhgorod export gas pipeline, have received wide renown in our country and abroad. The scientific and technical complex of the Institute of Electric Welding imeni Ye. O. Paton of the Ukrainian SSR Academy of Sciences needed only 2.5 years in order to develop and introduce in production this highly efficient technology in cooperation with organizations of the Ministry of Construction of Petroleum and Gas Industry Enterprises. The total national economic impact from the use of the developments exceeds on the average 150 million rubles annually.

The process of the formation of complexes in the sphere of science is of just as objective a nature as the setting up of production associations in industry. Both the former and the latter realize profound integration trends in the economy of mature socialism.

Developed processing methods and other scientific results begin "to live a robust life" only when implemented in production. Otherwise this is frozen capital. Hence the need for the improvement of the mechanism of the transfer of the latest achievements of science and technology to the national economy, which would ensure the introduction of the results of scientific research on a wide scale.

The development and introduction of new advanced processing methods are acquiring especially great importance in connection with the implementation of large-scale scientific and technical programs. The institutions of the Ukrainian SSR Academy of Sciences are fulfilling a large number of assignments of union programs in such areas as metalworking, automated control systems and computer technology, metallurgy, the fuel and power complex, nature conservation and the efficient use of resources. Within the framework of republic programs the basic contribution is being made to the development of the metalworking sectors and the fuel and power base of our republic.

The Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences, for example, developed a technology of the hot stamping of porous blanks, on the basis of which the seal rings of the running system of caterpillar tractors are produced. The Institute of Superhard Materials developed a technological process of the diamond honing of parts of hydraulic and pneumatic equipment, which made it possible to increase the productivity of the process by 1.5- to 2-fold.

A significant role in the fulfillment of the assignments, which are envisaged by the Food Program of the country, is being assigned to processing methods. They are oriented toward the increase of the yield of agricultural crops, the strengthening of the fodder base of animal husbandry, the decrease of losses during the storage, transportation and processing of agricultural products, the efficient chemicalization of farming and others.

In recent years scientists of the Ukrainian SSR Academy of Sciences have proposed a number of new processing methods, which are being successfully introduced in the sectors of the agroindustrial complex. The degree of the use of raw materials is increasing significantly owing to the use of waste-

free technologies of the production of various powdered foods from fruit residues and substandard fruits, as well as from sugar beets. The technologies of the storage of damp grain on threshing floors and of sugar beets in storage pits and the preservation of silage, haylage, various coarse and succulent fodders with the use of carbon ammoniates are ensuring a sharp decrease of losses. The technologies of the production of a liquid substitute of whole milk, mineral-ammonium premixes and carboxylene, the use of which in animal husbandry increases significantly the daily weight gains of young animals and the milk yields, are highly efficient.

Many hopes of modern production are correctly linked with the intensive development of biotechnologies. Synthesizing the basic achievements of biochemistry, physiology, molecular genetics and genetic engineering, these technologies are a radical means of the large-scale production of food and fodder products, chemical raw materials, fertilizers and medicinal preparations and the processing of production waste.

The basic research conducted by scientists of the Ukrainian SSR Academy of Sciences made it possible to develop the biotechnologies of the obtaining of fodder proteins by the processing of the worthless waste products and waste products of little value of plant growing. They have successfully undergone testing at a number of plants of the republic. In the very near future biotechnologies will be developed in the direction of the development of new bacterial strains and vegetative forms, as well as the fixing of atmospheric nitrogen, which will make it possible to solve the problem of obtaining inexpensive nitrogen fertilizers.

The inclusion of 42 developments of the Ukrainian SSR Academy of Sciences, a number of which were produced in cooperation with the Southern Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin and organizations of the USSR and Ukrainian SSR Ministries of Agriculture and the Ministry of the Chemical Industry, in the plans of introduction and pilot industrial checking of ministries and departments of the agroindustrial complex is of great importance in the fulfillment of the Food Program. Owing to the active assistance of a number of oblast committees of the Ukrainian CP their practical use has acquired a broad scale.

In particular, in Cherkassy Oblast new corn hybrids underwent experimental checking, in Ternopol Oblast--a mechanized technology of the cultivation of sugar beets, in Dnepropetrovsk Oblast--a technology of obtaining a liquid substitute of whole milk. It is important that the experience gained here would find application in other oblasts of the Ukrainian SSR, as well as outside the republic.

A profound connection with advanced processing methods is also characteristic of the development of such a very large production system of the country as the fuel and power complex. The Energy Program was formulated for the purpose of the further broadening of the energy base of the national economy, the significant increase of the generation of power and the optimization of its consumption in the USSR.

Scientists of the Ukrainian SSR Academy of Sciences have actively joined in the fulfillment of its assignments. They are working persistently on the questions of the improvement of the fuel and power base, the development of electric power engineering and the development of new deposits of organic fuel and are making a search for nontraditional energy resources and new means of the generation, transformation and storage of power. The results obtained by them have become the basis of the development of highly efficient generators and other equipment for hydroelectric, thermal electric and nuclear electric power plants, construction materials, which are intended for the harsh conditions of the cores of nuclear reactors, complex sets of control and measuring devices and means of the optimization of the operating schedules of power facilities. The physical modeling of the basic operating processes of technological magnetohydrodynamic plants has been performed, the scientific principles of the rating and designing of geothermal electric power plants have been developed. Recommendations for the Ukrainian SSR State Planning Committee on basic energy-saving measures have been formulated.

The importance of the implementation in the sectors of the national economy, at enterprises and associations of specific measures, which are aimed at the fulfillment of the assignments which are envisaged by the Energy Program, was stressed in the decisions of the January (1984) Ukrainian CP Central Committee Plenum. This requires the further concentration of efforts on the key problems of the development of power engineering and on large-scale scientific developments which are capable of having a substantial influence on the technical progress of the sector.

Advanced processing methods presume their close connection with the long-range directions of science and technology and the consideration of stable long-term trends in the development of social production. Therefore the preparation of scientific, technical and socioeconomic forecasts, which make it possible to predict the problems of the development of science, production and social relations, which have to be solved in the future, is an important task. Thoroughly substantiated forecasts make it possible to increase the practicability of plans and scientific and technical programs and to organize their fulfillment more efficiently. Scientists themselves need them, directive and planning organs are experiencing a great need for them.

In a report at the March (1984) Ukrainian CP Central Committee Plenum Comrade V. V. Shcherbitskiy stressed the need for systematic persistent work on the comprehensive program of the acceleration of scientific and technical progress in the republic with allowance made for the new trends and problems and posed the task of the formulation of republic comprehensive goal programs for the 12th Five-Year Plan and their close coordination with sectorial and regional programs.

The processing methods of different levels and for different purposes, which have been developed by scientists, are of great value. In essence, this is a significant portion of the national wealth and invaluable property of our society. Unfortunately, this wealth is being used not always efficiently and with the proper scope. As a result the rate of retooling and the level of production efficiency and, in the end, the indicators of the dynamics of the

national income of the country are declining. Enormous reserves, which it is necessary to put to use without delay, are hidden here.

The republic Academy of Sciences has a large amount of completed research, which has not yet received extensive application in the sectors of the national economy. Therefore along with the development of promising scientific directions the collectives of the institutes of the academy are concentrating their efforts on the immediate solution of the problems of the rapid and extensive introduction of completed developments.

Here scientists are frequently faced with difficulties of both a subjective and an objective order. Both departmental barriers and the inadequate interest of sectorial ministries are hindering the matter. Often there are no reserves of production capacities, there are not enough capital investments which are necessary for the rapid assimilation of innovations. The pilot experimental base of industry is also poorly developed. These circumstances are adversely affecting the rate of scientific and technical progress. They are also giving rise to such paradoxical situations, when domestic developments, for which licenses are sold to foreign firms, are assimilated significantly more rapidly by the latter and then are imported to our country.

At the present stage of the building of socialism the range and extents of the use of scientific and technical innovations are one of the indicators of the economic potential of the country. The increase of the growth rate of labor productivity and the achievement of high end national economic results depend to a decisive extent on this. The limitation of the sphere of use of the latest processing methods and equipment does not enable them to show fully their possibilities. According to the data of the USSR State Committee for Science and Technology, at present 80 percent of the new developments are introduced at only 1 enterprise, less than 20 percent--at 3-4 enterprises and only 0.6 percent--at 5 and more enterprises.

It is impossible, of course, to consider such a situation normal and it is necessary to correct it resolutely. The extensive and prompt "circulation" of the results of scientific developments should become an indefeasible law. It is not easy to achieve this. However, the experience of the Ukrainian SSR Academy of Sciences shows that with the support of oblast party committees and oblast soviet executive committees and the councils for the promotion of scientific and technical progress in the oblasts and republic it is possible to eliminate successfully many obstacles in the way of extensive rapid introduction. Especially as the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" makes very great demands in this regard on the management of enterprises and ministries.

The development and large-scale assimilation of new equipment and technology are an effective factor of our independence of foreign trade deliveries, which is of great political and state importance. The international situation, which has been extremely strained in recent times, is lending this problem particular urgency. This concerns first of all such items of imports as products of machine building, scientific equipment and others. Under present conditions the further development and intensification of the economic,

scientific and technical cooperation of the socialist countries are acquiring enormous importance. The need for this was stressed with new force at the Economic Summit Conference of the CEMA Member Countries, which was held in Moscow on 12-14 June 1984.

The objective trend of the transformation of science into a direct productive force under the conditions of the scientific and technical revolution is responsible for the closer and closer interdependence of scientific research and production organizations. Their fruitful cooperation is a reliable mechanism of the "transfer" of the latest achievements of science and technology to production.

We are attaching paramount importance to this question. Considerable experience in the organization of successful cooperation with production workers of various levels--from the enterprise to the ministry--has been gained. This is joint work with ministries and departments on comprehensive plans, programs of work with large enterprises and production associations, sectorial problem laboratories attached to academic institutes, contracts on creative cooperation and economic contracts. The holding of joint meetings of the Presidium of the Ukrainian SSR Academy of Sciences and the collegiums, which helps to settle promptly and responsibly the difficult questions of introduction and to extend it up to the scale of entire sectors of the economy, is contributing to the strengthening of cooperation with ministries.

At present the institutes of the academy are maintaining creative contacts with enterprises and organizations of 35 union and union republics, 20 ministries of the Ukrainian SSR and 10 ministries of other republics. In the system of the Ukrainian SSR Academy of Sciences 54 laboratories of 29 union and republic ministries are in operation. Much work is being performed in accordance with the contracts on creative cooperation, which the academy has with all the oblasts of the Ukraine and the republic capital of Kiev.

While developing and improving cooperation with production workers within these forms, which have withstood the test of time, scientists of the Ukrainian SSR Academy of Sciences are testing new forms to which life is giving rise. The setting up of creative collectives of scientists and production workers, which are oriented toward the solution of major scientific and technical problems, was a qualitatively new step in this direction. It is a question of the formation of close creative alliances, in which all matters, including the critical analysis of ideas, research, planning and design development and inventing activity, are carried out jointly. A good understanding of the possibilities and difficulties of each other, mutual responsibility and a thorough interest in the end results are characteristic of such collectives.

At the Ukrainian SSR Academy of Sciences similar collectives have existed for a long time now. Their activity is distinguished by great efficiency. Thus, for example, a creative collective was set up by the Institute of Electric Welding imeni Ye. O. Paton and the Zhdanovtyazhmash Production Association. Working in accordance with a unified plan, it is ensuring the prompt and large-scale solution of an entire group of problems of the development and

assimilation of innovations. The scientists and production workers have launched socialist competition under the motto "The union of creative thinking and creative labor for the rapid development and introduction of new equipment and technology." This initiative, which has been supported by other collectives of scientific research institutes and enterprises of the republic, received the endorsement of the Ukrainian CP Central Committee. The creative collectives, which were set up by the Institute of Cybernetics imeni V. M. Glushkov and the Production Association imeni S. P. Korolev (Kiev), the Institute of Problems of Material Sciences and the Brovary Plant of Powder Metallurgy (Kiev Oblast), have also achieved significant results.

The extensive establishment of temporary creative collectives is envisaged by the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy." In February 1984 the USSR State Committee for Science and Technology approved the model Statute on the Temporary Collective for the Performance of Work on the Solution of Long-Range Scientific and Technical Problems of an Intersectorial Nature, the Development and Assimilation in Production of New Equipment, Technology and Materials, which specifies the tasks, rights and duties of such collectives and regulates the procedure of their establishment, activity and material supply. This, undoubtedly, affords new possibilities and prospects for the rapid solution of urgent scientific and technical problems, the significant improvement of the use of the scientific and technical potential and the intensification of the integration of science and production. It is necessary to establish temporary collectives with the mandatory participation of workers of both the institutes of the Academy of Sciences and higher educational institutions, at which major scientific forces are also concentrated. This will make it possible to increase substantially the effectiveness of their joint research in the interests of the national economy.

Engineering centers, which are being set up for the purpose of the acceleration of the development, the large-scale introduction and the highly efficient use in the national economy of new advanced processing methods, materials, equipment and automated control systems, are another promising form of the creative cooperation of scientists and production workers. The work of such centers is oriented toward uniting the efforts of scientific research institutions and interested organizations of industry and construction on the fulfillment of specific tasks which are connected with the development and assimilation in production of scientific and technical innovations. They should specify the efficient spheres and scale of the use of developments, organize the performance of additional work for the purpose of bringing them as close as possible to the technological conditions of specific works, prepare the necessary technical specifications, perform start-up and adjustment operations, give consultative assistance to enterprises and carry out the training and advanced training of specialists.

It is necessary to approach the establishment of engineering centers creatively, without being carried away by the number and without allowing routine. Their activity should be closely linked with the work of the existing educational centers and subdivisions.

An educational center of welding, which was organized jointly with Kiev Polytechnical Institute, is in operation at the Institute of Electric Welding imeni Ye. O. Paton. In April 1984 an engineering center of pressure welding was set up, while in June an engineering center of electron beam technology was set up. Work is being performed on the establishment of engineering centers for robotics, microelectronics and several other directions of modern technology.

There is no need to prove the usefulness of engineering centers for the acceleration of the pace of scientific and technical progress. Production is experiencing an increasing need for them in connection with the increase of the responsibility of ministries for the fulfillment of the plans and assignments on the development of science and technology and for the assurance of a high technical level of products. Of course, ministries and departments should actively participate in the financing of the establishment of engineering centers and in the strengthening of their material and technical base.

People, their knowledge, experience and energy and an interested and responsible attitude toward the matter in the end determine the success of all the difficult and diverse work on the acceleration of scientific and technical progress in the national economy.

During the present period, when science is called upon to increase substantially its contribution to the intensification of the economy and the significant acceleration of the rate of its development, large scientific research organizations, including the Ukrainian SSR Academy of Sciences, have been faced in earnest with new and very difficult problems in the pursuit of their own personnel policy. It is a question of the stabilization of the numerical composition of the workers of scientific institutions and the "aging" of research collectives, of a certain decrease of the prestige of labor in science, which is turning into a decrease of the influx of capable young people, particularly in the area of the natural and technical sciences.

The noted trends are arousing serious anxiety, for in the future they may cause the slowing of the growth or even the decrease of the creative potential of our science. An active personnel policy, in the pursuit of which it is necessary to take as a guide the provisions, which are contained in the materials of the April (1984) CPSU Central Committee Plenum and the 1st Session, 11th Convocation, of the USSR Supreme Soviet and in the speeches of General Secretary of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet Comrade K. U. Chernenko, should ensure their surmounting.

The personnel policy of scientific research organizations should be aimed at the strengthening of all the units of management of scientific and experimental production subdivisions, the increase of the level of training of highly skilled specialists, their ideological training, the tightening up of labor discipline and the creation of a favorable creative atmosphere. The task of ensuring the steady increase of the effectiveness of scientific research requires that the people, who are fruitless from the point of view of the results of scientific work, be categorically released and that the

formalism when conducting certifications and competitions for the filling of positions of scientific associates be eliminated. The formation of a reserve of the management level of scientific institutions and work with it in the broadest sense, as well as the organization of a system of the increase of the skills and ideological and theoretical level of scientists are of great importance.

The search for talented scientific youth, the training of young scientists at academic institutions and higher educational institutions and the further improvement of the work of graduate studies, which are the basic form of the systematic and purposeful training of scientific and scientific teaching personnel, should be a subject of special attention.

A serious cause of the shortage of young promising specialists at scientific institutions is the disorder in the remuneration of their labor. Its level today is in 6th-7th place after a number of sectors of industry, construction and transportation. In our opinion, the increase of the remuneration of the labor of scientific associates with a certain decrease of their number could be one of the possible means of solving this problem under the conditions of the stability of the allocations for the development of science. The significant increase of the effectiveness and quality of research on the basis of the use of the latest methods of its conducting and the extensive application of automation is also necessary.

Great difficulties still exist in providing young specialists with housing. And now the settlement of the question of their hiring for work at an academic institute frequently depends not so much on knowledge and abilities as on the availability of living space. It is necessary to correct such a situation. The united efforts of the Ministry of Higher and Secondary Specialized Education and the Academy of Sciences and the support of party and soviet organs are needed here.

A higher level of cooperation of the Academy of Sciences and the Ministry of Higher and Secondary Specialized Education is also necessary in matters of the expansion of the training of specialists for new promising directions of research. It should be carried out more efficiently than is now being done. Scientists of the Academy of Sciences could assume the functions of instructors of new lecture courses and supervisors of special seminars and could give effective assistance to chairs of higher educational institutions. Higher educational institutions, in turn, should constantly improve the curricula and syllabuses and should orient the educational process toward the most promising directions of science and technology so that new sectors and works could be provided in the shortest possible time with well-training staffs of engineers and researchers. It is necessary to select the most capable students for such specialties.

It is important that young specialists, who have been assigned to scientific institutions, from the very start could count at least on the same wage as at enterprises of the sectors of the national economy. The increase of the allocations for the construction of dormitories and residences of the hotel type for young specialists and graduate students, so that the questions of housing would cease to be an obstacle when attracting fresh scientific forces

from various regions of the republic, is also of great importance. The necessary expenditures, undoubtedly, will be repaid with interest owing to the strengthening of the scientific potential and the increase of its yield.

The interests of the matter and the tasks of the intensification of research and the efficient use of the scientific potential require the goal-oriented training of personnel for the development of the urgent directions of science and technology. Today, when it is necessary to accelerate sharply scientific and technical progress in the national economy and the changeover from the extensive to the intensive means of the development of science itself, this question is acquiring an especially urgent and, perhaps, a decisive nature.

The need for the elaboration of measures and recommendations on the forecasting, formation and coordination of the themes of dissertation research and on the assurance of the optimum ratio of the contingents of doctors and candidates of sciences for the country as a whole is becoming more and more urgent. The changeover to the planning on the scale of the country of the themes of dissertation works is one of the practicable means of solving this problem. Such an approach makes it possible to establish the proper coordination in the choice of themes and will become a component in the system of state planning of the training of scientific and scientific teaching personnel.

The main role here belongs to the leading scientific and educational institutions, at which new promising directions of science and technology originate and undergo development and at which the preparation of dissertation works is mainly carried out. They can and should become the leading organizations in matters of the formulation of the themes of dissertations, their coordination with forecasts and programs and the assurance of the steady increase of the scientific topicality and practical importance of dissertation research.

The broadening of the preparation of dissertations directly in the plant sector of science is a serious task. Good opportunities for this are afforded in connection with the setting up of temporary collectives. They make it possible at the same time to develop advanced technological approaches and to strengthen the internal scientific potential of the operating works.

Much still has to be done for the successful accomplishment of the tasks of the 11th Five-Year Plan and the overcoming of the existing difficulties. Politically responsible, efficiently organized work on the maximum utilization of the enormous possibilities, which are incorporated in the advanced processing methods being proposed by science, is today a decisive factor of the extensive intensification of social production and its retooling. This is the first and an indispensable condition of success.

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GENERAL

DEVELOPMENTS IN KAZAKH MEDICINE, PUBLIC HEALTH

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 8, Aug 84 pp 3-6

[Article by M. I. Dauletbakova, chairman of the Scientific Medical Council of the Kazakh SSR Ministry of Health: "The Further Increase of the Efficiency of the Scientific Medical Potential of Kazakhstan"]

[Text] Owing to the tireless concern of the Communist Party and the Soviet Government the scientific potential of our republic in the area of medicine and public health is increasing from year to year. Today 3,800 scientists and educators, among whom are 203 doctors and 1,800 candidates of sciences, are working at 11 scientific research institutes, 5 medical higher educational institutions and the Alma-Ata Institute of the Advanced Training of Physicians. In all 29 specialized centers, including the regional Center for First Aid, which cooperates with the World Health Organization, and the Center for Nutrition, which cooperates with the World Health Organization, 3 all-union and 22 republic centers, are operating on the basis of specialized scientific research institutes and at medical institutes.

The medical scientific institutions and higher educational institutions of the republic are taking part in the elaboration of 11 goal programs of the USSR State Committee for Science and Technology, which include 44 assignments on the solution of the most important scientific and technical problems. Moreover, three additional programs with dates of the completion of the work in 1985 and 1988 are being fulfilled.

For the purpose of concentrating the efforts of the institutions of the Kazakh SSR Academy of Sciences and the republic Ministry of Health on speeding up the solution of the most important medical and biological problems of combating cardiovascular, oncological and viral infections and occupational diseases the Presidium of the Academy of Sciences and the Collegium of the Kazakh SSR Ministry of Health have approved a list of applied science problems which are liable to joint elaboration. At present research on 13 complex themes, which is being coordinated by the Commission for Medical Problems attached to the Presidium of the Kazakh SSR Academy of Sciences, is being conducted.

The rapid development of industry in Kazakhstan is finding its expression in the structure of the plan of scientific research work of the republic--more than 30 percent of the themes are devoted to questions of labor hygiene and

occupational diseases. In recent years 28 themes within "The Program of the Development of Scientific Research and the Acceleration of the Introduction of the Achievements of Medical Science in the Sectors of the Agroindustrial Complex for the Period to 1990" have been included in the republic plan. Included in the 1984 plan are 11 themes on "The Program of the Annual Dispensary System of the Entire Population."

In the immediate future the scientific institutions of the republic should conduct thorough research on the study of the influence of phosphorus and its compounds on the body of the workers of phosphorus enterprises, as well as study the influence of the environment on the public health conditions of the labor of workers of the Ekibastuz Fuel and Power Complex. In the accomplishment of these tasks we are counting on the cooperation of the main institutes.

The Kazakh SSR Ministry of Health and its Scientific Medical Council are constantly improving the system of the introduction of the achievements of science in practice. The activeness of the workers of practical health care both in the introduction of developments of scientists and in the use of their own suggestions is increasing with each year. Of the works, which were filed in 1983 for the awarding of prizes, two inventions, two procedural recommendations and three efficiency proposals belong to practical physicians.

The number and quality of the scientific achievements, which are being recommended for introduction, are the basic indicators of the efficiency of scientific research work. In 1983 11 scientific developments, which were included in the all-union plan of introduction, and 76 developments, which were included in the republic plan of introduction, were introduced. Moreover, more than 1,000 proposals were introduced in accordance with the plans of medical institutes and the oblast councils for introduction.

The proportion of dissertation works in the plan of introduction has increased. Half of the proposals (53.1 percent) of the republic plan of introduction and one-fourth (26.1 percent) of the plans of institutes follow from dissertation works.

Several developments have shown great medical diagnostic and economic efficiency. Thus, the introduction of the methods of the diagnosis and treatment of the expiratory stenosis of the trachea and the large bronchi, which were developed by the Kazakh Scientific Research Institute of Clinical and Experimental Surgery imeni A. N. Syzganov and the All-Union Scientific Center of Surgery of the USSR Academy of Medical Sciences, is leading to the labor rehabilitation of patients, a portion of whom were invalids of the first and second groups. In 1983 this proposal was successfully introduced at the most important institutes of our country: the Leningrad Scientific Research Institute of Pulmonology, the Kiev Scientific Research Institute of Tuberculosis, Pulmonology and Thoracic Surgery, the Novosibirsk Scientific Research Institute of Tuberculosis, as well as at the lung surgery clinic of the Magdeburg Medical Academy (GDR) by way of international cooperation.

The introduction of the set of measures on the prevention of the infection of people with tuberculosis from animals, which were developed by the Kazakh

Scientific Research Institute of Tuberculosis jointly with the Central Scientific Research Institute of Tuberculosis and the Novosibirsk Scientific Research Institute of Tuberculosis, made it possible to improve the early diagnosis of tuberculosis among stock breeders. The economic efficiency per stock breeder, who was actively identified as ill with urogenital tuberculosis, came to 3,127 rubles. The chemical preventive treatment of tuberculosis led to a significant decline of the incidence of illness and provided an economic impact per 100 stock breeders in the amount 1,217 rubles.

The creative activeness of scientists increased. In 1983 44 percent more applications were submitted to the State Committee for Inventions and Discoveries than in 1981. In the past 3 years 170 positive decisions and certificates of authorship were received, more than 100 of their own and adopted inventions were introduced.

The organs of information are carrying out the priority information support of the comprehensive goal programs.

The successful implementation of extensive measures on the protection and strengthening of public health requires the solution of difficult scientific and practical problems, to which the June (1983), December (1983) and February (1984) CPSU Central Committee plenums directed attention. It should be admitted, however, that the significant human, material and financial resources, which medical science of the republic has, are not always being used efficiently, there are oversights and omissions. This applies to all the stages of the development of science, beginning with planning and ending with the introduction of the results of scientific research work.

The analysis of the scientific activity of scientific research institutes and higher educational institutions, which was made by the Scientific Medical Council of the Kazakh SSR Ministry of Health after planned checks, showed that, in spite of repeated reprimands, at a number of institutions the study of minor themes and the lack of conformity of the themes of individual subdivisions to the type of institute are still occurring, the structure of a number of scientific research institutes needs improvement.

During 1983-1984 the Scientific Medical Council of the Kazakh SSR Ministry of Health implemented a number of organizational measures, which were aimed at the increase of the effectiveness of scientific research at subordinate institutions. Among these measures one should note the introduction of a system of the protection of drafts of plans and reports, the introduction at individual institutions of the goal program method of planning, the stepping up of the work of the republic problem commissions and the Council of Scientific Medical Societies, the analysis of the quality of the training of scientific personnel at subordinate institutions at the plenum of the Scientific Medical Council and the collegium of the ministry, the comprehensive check of the activity of specialized councils and a number of scientific research institutions with discussion in the collegium and the analysis of publishing activity.

All this was a prerequisite to the adjustment of the structure of scientific institutions--a complex question.

When streamlining the structure attention was directed to the conformity of the subdivision to the type of institute, the topicality and promise of the theme being elaborated, the effectiveness of scientific research, the creative activeness of managers and associates, the introduction of results in practice and the training of scientific personnel. The specialized main administrations of the Kazakh SSR Ministry of Health took part in the revision of the structure of the scientific research institutions.

When reforming the structure the subdivisions, which were close in type, were united. The small, but scientifically promising subdivisions were reinforced. The inefficient subdivisions were eliminated, while the nonspecialized subdivisions were transferred to institutions which are homologous in type.

The Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases is one of the first institutions, which was established in 1925. In the republic the institute has a good reputation. It has made a significant contribution to the matter of combating infectious diseases in Kazakhstan and to the elaboration of urgent scientific problems and the training of scientific personnel. It is well staffed with scientists, provides good scientific products and has more than once been the winner in the socialist competition.

Meanwhile, the structure of the institute for many years had not undergone a critical evaluation. As a result nonspecialized subdivisions were set up and operated here.

The Scientific Medical Council jointly with the Main Sanitary Epidemiological Administration ordered the management to revise the structure with allowance made for the infectious illness rate in the republic.

The board of directors of the institute performed much work on changing the structure of the institution. The laboratory of occupational allergosis, which studies allergodermatoses, was transferred to the Scientific Research Institute of Skin and Venereal Diseases. The laboratory of viral genatite was strengthened (from 10 to 20 associates), which is making it possible to plan a comprehensive theme on the study of the regional peculiarities of the epidemic process of viral genatites A and B in Kazakhstan and on the establishment of the factors which are responsible for the formation of the seasonal increase of the incidence of illness with genatite A on territories with a different level of the incidence of illness. By means of the elimination of the laboratory of antigen structure in the department of microbiology a laboratory of bacterial culture mediums was established.

In a republic with developed animal husbandry, such as Kazakhstan is, brucellosis was and remains a regional pathology. However, the research on brucellosis, which was conducted at one time in the republic and was widely known in the country, in the past 10-15 years has been reduced sharply. The one small laboratory, which existed, and the clinical group could not conduct scientific research at the proper level without a clinical base. In this connection a department of brucellosis with two laboratories and a 60-bed clinical department on the basis of the republic hospital was set up a the

institute by changing the specialization of the beds. The department is called upon to study the scientific and organizational aspects of the decrease of the incidence of illness of the population with brucellosis by the improvement of the system of epidemiological inspection of the seats and to improve the methods of the diagnosis, treatment and prevention of the disease.

A laboratory of dysentery and other acute intestinal infections was set up at the institute. The task of the laboratory is the study of the epidemic process and the improvement of the methods of the diagnosis and prevention of dysentery and other acute intestinal diseases. A laboratory of intestinal viruses was organized on the basis of the existing laboratory of cytopathology. The organizational methods division was reinforced by a group of introduction.

Thus, the structure of the institute was brought in line with its scientific tasks, which at the same time also made it possible to regulate the ratio of senior scientific associates to junior scientific associations, which has now been brought to 1:2.

After the comprehensive check and review of the activity in the collegium in December 1983 the structure of the Scientific Research Institute of Regional Pathology underwent significant change. Although its basic direction is hygienic, the scientific forces here were diverted for the elaboration of questions of the history of medicine and the clinical pathophysiology of the central nervous system and for the elaboration of functional methods of the diagnosis of brain injuries. Moreover, questions of endocrinology, health resort treatment and physical therapy were elaborated. There was a critical article on the serious shortcomings in the activity of this institute in MEDITSINSKAYA GAZETA (17 February 1984), "Under the Spell of Minor Themes."

At present the problems of hygiene, the organization of health care and social hygiene have been specified as the basic direction of the scientific activity of the institute.

By uniting the artificially separated fragments of themes and the removing minor themes from the plan and as a result of the transfer of individual subdivisions to other institutions in the 1984 plan 18 themes were approved instead of the 38 themes proposed by the institute.

In spite of the performed work, the structure of the Scientific Research Institute of Regional Pathology is still far from perfection. The name of the institute does not correspond to its purpose. Individual nonspecialized subdivisions still remain in it.

Many adjustments were also made in the structure of the Kazakh Scientific Research Institute of Oncology and Radiology, which made it possible to improve the work of the diagnostic laboratories and to eliminate elements of duplication in the research of a number of subdivisions.

The Kazakh Scientific Research Institute of Pediatrics, being a scientific research institute of the third category, experienced great difficulties with personnel. At the intercession of the republic the second category was

awarded to it as of 1984, which will contribute to the attachment of scientific personnel. The scientific potential of this institute also increased in connection with the placement into operation of a new building of the institute. The Scientific Research Institute of Skin and Venereal Diseases also received a new polyclinic building. Of the 11 medical scientific research institutes of the republic 9 underwent some structural changes or others. The accomplishment of the reorganization involved, undoubtedly, considerable difficulties.

The measures on the revision of the structure of subordinate institutes made it possible to concentrate scientific forces and material resources on the most important directions of scientific research, which are of special importance for the practice of republic health care. At the same time, the implemented reorganization by means of the use of concealed reserves made it possible with respect to the department as a whole to provide a saving of the wage fund in the amount of 95,357 rubles in 1982 and 33,430 rubles in 1983.

The Scientific Medical Council of the Kazakh SSR Ministry of health regards as one of the means of increasing the scientific medical potential of the republic the organization in the future of separate medical institute laboratories, at which expensive instruments can be concentrated.

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GENERAL

MEASURES FOR ACCELERATING S&T IN LITHUANIA DISCUSSED

Vilnius KOMMUNIST in Russian No 8, Aug 84 pp 8-14

[Article by A. Brazauskas, secretary of the Central Committee of the Communist Party of Lithuania]

[Text] During the years of the 11th Five-Year Plan, Soviet Lithuania's national economy has developed at a more rapid rate than designated by the five-year plan. In the first 3 years, the republic's national income increased almost 19 percent instead of the 10 percent designated by the plan for this period. The share of the national income produced through a rise in labor productivity amounted to 92 percent versus 81 percent for the target. Our industry is developing at a higher tempo compared to plan indicators. Three-year targets for capital investment and construction and installation work have been overfulfilled. Capacities at electric-power, fuel and thermal facilities went into operation on schedule. Better operational indicators are being provided as well by other sectors of the national economy. This is becoming an important prerequisite of constant improvement of the people's living standard--in 1983 compared to 1980, per-capita real income grew 6 percent, earnings of workers and employes--7 percent and pay of kolkhoz farmers--14 percent.

A most important task of the 11th Five-Year Plan is being realized--improvement of the well-being of the Soviet people through development of the national economy, acceleration of scientific-technical progress and conversion of the economy to an intensive course of development and more rational use of the production potential and economy of all types of resources and improvement of work quality. The 26th CPSU Congress and subsequent plenums of the CPSU Central Committee emphasized the leading role of scientific-technical progress without which it would be difficult to imagine any progress in raising production efficiency, intensifying it and in economizing all types of resources and improving production quality.

We must consider as a very important aim of the scientific-technical revolution the end result which determines social-economic progress, the technical level of production with all its use and esthetic qualities and its correspondence to the best domestic and world models. It is therefore necessary to evaluate on the basis of the end result the effectiveness of such measures as scientific technical progress, inasmuch as production, regardless of what its designation might be, serves to satisfy the needs of a person. On

the other hand, the end result--the real product--reflects the degree of suitability of the entire complex of measures aimed at raising the efficiency of public production and its appropriateness and benefit.

In Soviet Lithuania, this aim is served by a whole complex of measures for accelerating and realizing the achievements of scientific-technical progress. At the present time, there are in operation in the republic 140 scientific-research, planning and design organizations, experimental stations and experimental plants, including 60 scientific-research institutes, affiliates and departments. Twelve institutes function within the system of the Lithuanian SSR Academy of Sciences. A large amount of scientific-research work is conducted by 13 higher educational institutions, which have at their disposal 13 problem and 35 sectorial laboratories and many scientific-research institutes as well as 32 organizations of the planning-and-design and technological type. Approximately 39,000 persons work at scientific-research, experimental and design institutions.

Many facts serve as evidence of the contribution of this complex. Thus last year alone, more than 900 scientific-technical measures specified by the state plan of economic and social development were realized in the final stage of technical progress, that of introduction. This made it possible to increase the amount of profit by 14.5 million rubles, to reduce the number of workers employed in heavy manual labor by 1,150 persons, to almost double the number of industrial robots, to introduce quite a bit of other equipment and to develop the manufacture of new types of products and models more closely meeting the needs of consumers.

A great deal is indicated by the fact that the republic's Academy of Sciences by itself is taking an active part in the solution of 21 union complex programs, 15 republic and 6 intersectorial complex programs. Much has been done in the republic for the development of power engineering, machine building, construction and the construction materials industry and in the creation and improvement of electronic and computer technology, vibration equipment, galvanic coatings and others. The cooperation of VUZ's with production collectives is expanding. Through the efforts of scientists, in the first 2 years of the present five-year plan, about 700 developments were introduced into the republic's economy. Their total economic effect amounts to almost 70 million rubles.

The Central Committee of the Communist Party of Lithuania and the republic's government devote a tremendous amount of attention to the development of the scientific potential, bolstering the effectiveness of scientific developments and strengthening of ties with production. These questions have been discussed a number of times recently, and a number of special documents were adopted in which concrete measures are outlined for improving the coordination of scientific-research and experimental-design developments, bolstering the effectiveness of work of scientific-research, planning-and-design and technological organizations and developing patent and license work. One such document is the decree of the Central Committee of the Communist Party of Lithuania and the Lithuanian Council of Ministers "On Heightening the Effectiveness of Scientific Research and Strengthening the Role of Science in Accelerating Scientific-Technical Progress in the Republic's National Economy

in the Light of the Decisions of the 26th CPSU Congress."

Special measures have been designated and implemented for increasing the integration of science and production. Scientific-production complexes and associations operate on the voluntary service principle. Among them, major work is being done by Elektronika Association, which consists of 12 scientific-research and production organizations, solving pressing problems of automation and robotization of production processes and others. Vibrotekhnika Scientific-Production Association is operating successfully. The republic's VUZ's have done a great deal in creating educational, scientific and production associations operating on a voluntary basis. These, of course, are only the first steps. It is necessary to look for new forms of integration of science and production.

Despite the achievements and increased effectiveness of production and its intensification, the most important problems in the process of scientific-technical progress continue to be conformity of the technical level of production with modern requirements and needs.

True, we point out each year growth of the quantity of products that are developed for the first time in the country. Also the number of items is increasing that are conferred the state Seal of Quality. But in addition to good products, we have been supplying metalshaping machine tools, which of late have not been in demand either in the country or abroad. In 1982, only 32 percent of new machines and equipment were in terms of technical parameters on the level of the best models of comparable domestic or foreign products. Consumers are not satisfied with tape recorders and to some extent bicycles and television sets made in our republic. Despite certain technical measures--reequipment of production, modernization of production capacities and the employment of improved technology, footwear and sewn goods still provoke complaints. The furniture industry seemingly provides good products, but the consumer in assembling the furniture at home is sore put because of inadequate precision and attention by furniture makers in making up parts and components. Customers are dissatisfied with a number of under and outer knitwear products as well as with certain cultural, everyday and domestic use products.

The technical level of production is also reflected in external appearance, weight and practicality. We have good designers, but much of their work lags behind today's requirements. This primarily is indicative of unsatisfactory work by planning and design organizations and the Vilnius affiliate of the All-Union Scientific-Research Institute of Technical Esthetics, but a share of the responsibility rests with the producers.

An instructive example is to be seen in searches and concrete efforts aimed at improving the technical level of refrigerator production. The work is done with perspective, products are constantly being improved, and new products correspond to the growing requirements of consumers both in an esthetic and in a practical sense. This is an example that should be emulated by our entire industry.

The necessity of raising the technical level of production and of products

puts important tasks before the single unit "research--design--introduction" and basically calls for a restructuring of scientific-research work, more effective use of the existing scientific potential and significant reduction of time in the introduction of scientific-technical achievements to production. Special attention should be paid by scientists to such important problem questions as raising labor productivity, more effective utilization of the economic and scientific-technical potential, reduction of the amount of manual labor, material and energy outlays, economy of labor resources, fuel, raw materials and power and creation of new more effecitve construction materials. All this can faciliate both the creation and introduction of modern machines and technologies, automation of production and the solution of tomorrow's tasks in regard to providing the broadest possible use of computers and robots and the introduction of a flexible technology, making it possible to quickly and effectively revise production for the manufacturer of new products.

In the matter of raising the technicallevel of production, particular importance is to be attached to the decree of the USSR State Committee for Standards, the USSR State Committee for Science and Technology, the USSR State Planning Committee and the USSR State Committee for Prices of 17 February 1984 "On the Procedure of Certification of Industrial Products on the Basis of Two Categories of Quality." This document, adopted in accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers of 18 August "On Measures for the Acceleration of Scientific-Technical Progress in the National Economy," went into effect on 1 July of this year. It pointed out that as of then products are to be certified solely on the basis of two categories of quality--highest and first. This is intended to ensure the production of such products as would corrrespond in their technico-economic indicators to the highest world standards and satisfy the needs of the national economy and the population of the country as well as of export. Tremendous work awaits us in this field, and for its successful fulfillment it will be necessary to eliminte defects which up to the present time have prevented us from providing consumers with products of a significantly higher level.

In raising the technical level of products, a great deal depends first of all on work effectiveness of scientific-research organizations. Thus on the one hand, the number of actual developments seemingly grows, but, on the other, a significant portion of them does not always reflect the real needs of industry and other sectors of the national economy. This is indicated by the correlation between completed and definitely introduced developments. Only one-third of the items have been definitely introduced which were completed on the basis of contracts with Kaunas Polytechnic Institute imeni A. Snechkus, Vilnius Engineering Construction Institute and Vilnius State University imeni V. Kapsukas.

At institutes of the Lithuanian Academy of Sciences, VUZ's and other organizations, items accumulate that have found no application in practice. They include many inventions. Thus in the period from 1976 through 1981, scientific institutions and VUZ's received more than 3,000 author's certificates, but only one-third of them have been introduced. At the same time, the Order of the Labor Red Banner Institute of Chemistry and Chemical

Technology of the Lithuanian SSR Academy of Sciences has been rather successfully introducing its developments into practice.

Such a condition will evidently be characteristic of individual scientific-research institutes until their developments are essentially on the level of the ideas. It would appear that the accomplishment of developments must correspond to the concrete needs of industry and other sectors of the national economy. Furthermore, if scientists and inventors participated more actively and generally in the practical realization of their developments, the effect would be more significant.

This is shown by another example. In the second year of the five-year plan, at 29 scientific-research, design and technological organizations of 18 ministries, the economic effect remained unclear of 60 percent of them although almost 12 million rubles had been spent on their development. At a number of scientific-research institutes and design organizations, the economic effective per ruble spent amounted to only 10-50 kopecks.

Together with effectiveness of developments, their newness is of tremendous importance. Despite the fact that the number of solutions and researches equated with inventions increases with each year, yet not everything has still been done here. Thus, Lithuanian SSR still lags significantly behind neighboring republics in raising the effectiveness of patent and license jobs and their sale. At the same time, this field specifically objectively reflects the technical perfection of solutions and the ability to compete with the best models.

Among the reasons for these defects, it is necessary to mention the weak experimental base of the scientific-research institutes and design buros.

A number of ministries and departments have paid insufficient attention to this question over the course of a long time. Although of late they have started to do something about it, still it is not that easy to overcome the lag. And not everything in this sphere has been done by the institutes of the Lithuanian Academy of Sciences. Here there is a lack of experimental base for the reason that organizations of the Ministry of Construction lag in completing construction and installation work at these facilities.

Thus it is necessary to resolve significantly more effectively the most important national-economic problems and to more rapidly raise the technical level of products at the very first stage of scientific-technical progress. The main load should be placed on planning and design organizations. For this reason, heads of scientific-research and planning and design institutions as well as party organizations must pay greater attention to the subject matter of the work being completed, its pertinency and the quickest possible introduction into production, especially to the end results of production--the future product. Party gorkoms and raykoms could do significantly more in monitoring the work of scientific-research and other institutions.

In addition to this, it is necessary to see to it that the actual producers more actively raise problems of technical level of products and, most of all, become more interested in scientific achievements and concerned with their

most rapid introduction into practice. "Production," it states in the Accountability Report of the CPSU Central Committee of the 26th party congress, "must be vitally interested in faster and better assimilation of the fruits of thought and the fruits of labor of scientists and designers." Unfortunately, up to now one still has occasion to come across cases where producers avoid ideas and innovations proposed by scientists. And here the word of party raykoms and gorkoms and party organizations of production collectives is called upon to be more weighty and mobilizing.

Clearly, planning organizations must give great consideration to the needs of producers. The fact is that the introduction of an innovation requires a great deal of preparation. But how can you prepare when you have to fulfill strenuous plans?

In the solution of the entire complex of problems of scientific-technical progress on the production level and constant rise of the technical level of production, tremendous importance is to be attached as well to plans of introduction of new technology, development of scientific-technical progress and reequipment. Regardless of what they are called, ministries, departments and enterprises themselves having been paying of late inadequate attention to these plans. This also applies both to preparation of plans and to their realization. In individual years of the present five-year plan, the ministries of construction materials, meat and dairy industry and local industry have been unable to cope with these plans.

Serious omissions occur because at times plans are compiled formally according to obsolete patterns and do not reflect the most important problems of raising efficiency of production and the technical level of products. At the same time, they must basically be oriented toward the creation and introduction of new equipment and the use of a more perfect technology. Considerably more attention should be given to analysis of the technical level of production. In this regard, the industry of construction materials and light and local industry deserve censure. Planning-and-design and technological subdivisions exert a weak influence on production activity. It is no accident that topics relating to analysis of the technical level of production constitute only a small part among other developments. This is manifestly an abnormal situation.

We frequently complain about the big weight and size of products put out by our industrial enterprises and about unjustified outlays of raw and other materials for their production. All these are problems of product design and the inability to use advanced technology. Questions of technology, making it possible to economize on resources, are the most important on the road to new heights of intensification of production. This is especially pertinent in the case of the metalworking industry, where one-fifth of all the metals used in the republic goes into shavings and wastes. And here both designers and planners and production people as well are at fault. It is necessary to rely on already created advanced technology, let us say on drop forging and powder metallurgy and at the same time to constantly look for new variants in solution of the problem. This would facilitate not only economy of raw and other materials but also what is the main thing--most products would achieve a significantly higher technical level. It is necessary to fight for this with

all available means, and party organizations must not stay aloof from this.

Cases are also frequent where the process of adoption of new items drags on excessively. There are more than enough such examples at enterprises of the machine-building industry and at Shyalyay Vayras Bicycle and Motor Plant. On the other hand, production of obsolete products also drags on excessively. Thus at the plants Komunaras, imeni 40-Letiye Oktyabrya, Vilnius Grinding Machine Plant and Shyalyay Machine Tool Building Plant, the same products have been produced for decades. A third of the products at enterprises of the electrical equipment industry and almost two thirds of the products of the Vilnius Fuel Equipment Plant imeni 50-Letiye SSSR have been made for 10 years or more. It is hardly necessary to speak of the consequences of such a situation.

Recently, the problem of effective use of acquired equipment has become pressing. Hurrying to acquire manufacturing equipment or entire lines of domestic or foreign manufacture, we frequently forget to think of what they would provide for production and whether they would permit a comprehensive solution of the questions of reequipment. When the prospect of using new equipment is hurriedly and insufficiently responsibly considered, the equipment frequently remains idle and as a result not only are capacities poorly used, but what is more important, the produced products do not satisfy the needs of users.

The solution of questions of raising the technical level of products largely depends on how basically the measures specified by complex quality control systems of products are carried out and whether they were designated while taking into consideration the requirements of tomorrow and whether reliability and the esthetic aspects and other use qualities are taken into account. Of late, complex systems of quality control of products are being used at 362 enterprises in the republic. They are providing positive results at Panevezhis Elektronika Experimental Plant, Vilnius Furniture Combine, the production association of construction and finishing machines and at other enterprises where products of the highest category of quality make up 70-80 percent of the total volume. Implementation of measures designated in the decree "On the Procedure of Certification of Industrial Products on the Basis of Two Categories of Quality" requires a great deal of reorganization and improvement. This also places additional tasks before party personnel in regard to control of the work of responsible personnel and the elimination of causes of failure.

Improvement of quality and constant raising of the technical level of production should be facilitated by concrete forms of socialist competition that must be aimed not so much at intermediary as at end results. As we know, the collective of Vilnius Furniture Combine recently became the initiator of a competition for improving and expanding the assortment of consumer goods. Its example has already been followed by tens of other enterprises. But the duty of party and trade-union committees and organizations is not only to ably disseminate this valuable experience but also to make sure with the help of the agency of party supervision that each new product fully satisfies the growing needs of the population.

At the present time, a complex program of scientific progress to the year 2005 has been worked out in the republic under the supervision of the Lithuanian SSR Academy of Sciences. It designates the most important directions of economic and social development and of scientific-technical progress. Among the most important are measures aimed at strengthening the potential of scientific-technical progress, improving the fuel-power base and others. Almost 150 organizations and more than 300 scientists and specialists of the economy took part in the development of the program. It is very important that these fruits of collective work find due use for speeding up scientific-technical progress in the republic's economy and serve to raise the technical level of production.

An important sector of work for each communist, each party organization and party committee as well as for local soviets and their ispolkoms is increasing the responsibility of collectives and personnel for the development of scientific-technical progress. In the decree adopted last year of the CPSU Central Committee and the USSR Council of Ministers "On Measures for Accelerating Scientific-Technical Progress in the National Economy" it is emphasized that responsibility for the technical level of production and quality of production is still not sufficiently ensured at many ministries and departments,associations and enterprises. Although much has been done in the republic for the introduction of concrete measures prescribed in this decree, major and imperative work still lies head. This applies not only to party but also to soviet, economic, trade-union and komsomol organs. They must rally collectives of workers and their party and public oranizations and deputy groups from enterprises for carrying out the decisions of the April (1984) Plenum of the CPSU Central Committee and the 14th Plenum of the Central Committee of the Communist Party of Lithuania and for speeding up technical progress.

7697
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GENERAL

FIGURES ON UKRAINIAN SCIENTIFIC, TECHNICAL PROGRESS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 8, Aug 84 pp 65-67

[Article by the Ukrainian SSR Central Statistical Administration: "Scientific and Technical Progress"]

[Text] Owing to the joint efforts of Soviet scientists in the Ukraine for the first time in the USSR the atomic nucleus was split and heavy water was obtained, powder metallurgy and special electrometallurgy were developed, a domestic computer was built and the industrial technology of obtaining synthetic diamonds was developed.

Number of Scientists
(at the end of the year, thousands)

	1970	1980	1983
Total scientists (including science teachers of higher educational institutions)	129.8	195.8	203.3
including those having the academic degree of:			
doctor of sciences	3.1	4.8	5.4
candidate of sciences	33.3	58.0	64.4
Of the total number of scientists, those having the academic title of:			
academician, corresponding member, professor	2.6	3.8	4.1
docent	12.1	19.2	21.9
senior scientific associate	5.1	8.4	9.6
junior scientific associate	3.5	1.9	2.8

During the past five-year plan alone scientists of the republic made six discoveries. Physicists, for example, established the previously unknown phenomenon of quantum diffusion in crystals. This discovery made radical changes in the idea about the structure and dynamics of crystals and led to the emergence of a new scientific direction--the physics of quantum crystals.

Today scientists of the Ukrainian SSR are taking part in the fulfillment of 160 of the 170 all-union scientific and technical programs.

Significant progress has been achieved in the study and use of land and water resources and in the formulation of the scientific principles of the building of fast reactors with a dissociating coolant. The study of the geological structure and the evaluation of the prospects for minerals of the territory of the Ukraine are of great importance for the development of the mineral raw material base of the country.

Materials technologists and chemists of the academic institutions of the Ukrainian SSR have developed methods of obtaining inexpensive hydrogen for power plants.

Women Among Scientists
(at the beginning of the year, thousands)

	1970	1980	1983
Total female scientists	45.8	72.9	76.8
including those having the academic degree of:			
doctor of sciences	0.4	0.7	0.7
candidate of sciences	8.0	14.5	16.5
Of the total number of female scientists, those having the academic title of:			
academician, corresponding member, professor	0.3	0.4	0.5
docent	2.3	4.1	4.8
senior scientific associate	1.3	1.8	2.0
junior scientific associate	1.6	0.9	1.4

Invention and Efficiency Promotion in the National Economy

	1971-1975		1976-1980		1983
	Total	Average a year	Total	Average a year	
Number of authors who submitted efficiency proposals and applications for proposed inventions, thousands	X	778	X	961	1018
Number of submitted efficiency proposals and applications for proposed inventions, thousands	4877	975	5303	1061	1065
Number used in production, thousands:					
inventions	38	8	76	15	16
efficiency proposals	3711	742	4216	843	869
Expenditures on invention and efficiency promotion, millions of rubles	262	52	342	68	76
Economic impact from use of inventions and efficiency proposals, millions of rubles	3983	797	5932	1188	1449

On the basis of basic research fundamentally new technological processes and equipment were developed and introduced in the majority of sectors of production: automated coal complexes and systems of machines; units for the continuous teeming of steel, electroslag refining and casting; machine tools for the electrophysical and electrochemical machining of metals and several construction materials, equipment for a low-waste and waste-free processing method, the automatic welding of large-tonnage parts and large-diameter pipes.

Number of Descriptions of Items, to Which the State Emblem of Quality Was Awarded
(thousands)

1970	1980	1983
0.4	10.6	10.5

At the beginning of 1984 18,500 items had the State Emblem of Quality.

Expenditures on the Introduction of Scientific and Technical Measures in Industry and Their Economic Effectiveness

	1971-1975		1976-1980		1983
	Total	Average a year	Total	Average a year	
Measures introduced, thousands	519	104	671	134	168
Actual expenditures on introduction of measures, including expenditures of past years, millions of rubles	5021	1004	7133	1427	1880
Number of conditionally freed workers, thousands	511	102	575	115	118
Increase of profit from introduction of measures per year, millions of rubles	2235	447	2927	585	764
Annual economic impact from introduction of measures, millions of rubles	3241	648	4150	830	1034

The introduction of scientific and technical measures and the implementation of measures on the scientific organization of labor during 1971-1983 provided 68 percent of the total increase of labor productivity in industry.

The implementation of measures on the scientific organization of labor in 1983 provided a saving of the labor of 68,000 people.

The Availability in Industry of Mechanized Flow and Automatic Lines, Completely Mechanized and Automated Sections, Shops, Works, Enterprises (on 1 July, thousands)

	1971	1981	1983
Availability at industrial enterprises of:			
mechanized flow lines	16.6	27.7	29.1
automatic lines	1.6	4.3	4.8
completely mechanized and automated sections, shops, works	8.2	18.2	19.3
Number of completely mechanized and automated enterprises	1.0	1.1	1.1

On 1 July 1983 there were 18,200 units of equipment with programmed control in industry.

7807
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GENERAL

UKRAINIAN SCIENTIFIC, TECHNICAL SOCIETIES CONTRIBUTE TO PROGRESS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 8, Aug 84 pp 61-64

[Article by Deputy Chairman of the Ukrainian SSR Council of Scientific and Technical Societies V. Lola: "The Contribution of the Scientific and Technical Societies of the Republic to the Acceleration of Scientific and Technical Progress"]

[Text] In the solution of the problems of the acceleration of scientific and technical progress an important role is being assigned to scientific and technical societies, which in our republic unite 2.65 million people. The development of new highly productive machines, equipment and advanced technological processes, the mechanization, automation, technical perfection and improvement of the organization of production are at the center of attention of the scientific and technical societies.

The experience of the work of the scientific and technical societies of enterprises and organizations of power engineering and the electrical equipment industry merits attention. The scientific and production collectives of this sector are taking part in the implementation of four union scientific and technical comprehensive goal programs and five union programs on the solution of the most important scientific and technical problems, as well as the republic programs "The Power Complex," "Labor" and "The Materials-Output Ratio" and a number of sectorial programs. The tasks of the organizations of the scientific and technical societies of the sector on their fulfillment were examined at the plenum of the republic board. In conformity with the decree the oblast boards drafted comprehensive plans of the participation of the organizations of the scientific and technical societies and their creative associations in the practical implementation of the programs. On their basis the republic board drafted a consolidated plan of an entire set of measures (conferences, meetings, competitions, reviews, scientific business trips, the creation of creative brigades and others), which are contributing to the fulfillment of the assignments set by the programs.

The construction of powerful nuclear electric power plants is now the general direction of the development of power engineering. With allowance made for this the Ukrainian SSR Ministry of Power and Electrification jointly with the sectorial board of the scientific and technical societies of power engineering

formulated recommendations on the problems of the designing, erection, start-up and operation of nuclear electric power plants, which ensure a comprehensive approach to the solution of the problem.

On this level the experience of the organizations of the scientific and technical societies of Lvov Oblast is interesting. The Oblast Council of Scientific and Technical Societies jointly with the Western Scientific Center of the Ukrainian SSR Academy of Sciences is working on the important problem of the strengthening and improvement of the creative contacts of science and production. New organizational forms of the combination of knowledge and labor have been approved--interdepartmental scientific production and educational production complexes and associations, in the management organs of which the sectorial boards of the scientific and technical societies at the level of the chairmen and their deputies are represented.

Today 65 stages of union programs (at 30 enterprises), 39 stages of republic programs (at 35 enterprises), 7 comprehensive regional scientific and technical and socioeconomic programs and 300 contracts on creative cooperation, the implementation of which by the end of the five-year plan will make it possible to obtain a saving of 115 million rubles, are being fulfilled within the complexes and associations.

The innovative search of the scientific and technical community of Dnepropetrovsk Oblast on the extensive introduction of the principles of the scientific organization of labor and the increase of the efficiency of the labor of specialists should be noted. The experience of the Dnepropetrovsk combine builders on the increase of production efficiency was approved by the Ukrainian SSR State Committee for Standards. The plant launched a campaign for the economical use of all types of resources. It was necessary to ensure steadily increasing volumes of production of high quality products for agriculture with the least expenditures of manpower. So then they decided initially to make an inventory, and then to carry out the certification of workplaces. The plant workers performed all the work jointly with scientists. The identification of the existing reserves of the increase of labor productivity by the more complete utilization of the stock of machines was the leading unit in their work. And here is the result: during this five-year plan labor productivity is increasing at the plant on the average in a year by 13-14 percent, 98.5 percent of the products are being turned over on first appearance, 80 percent of them are being certified with the State Emblem of Quality, since 1980 670 workplaces have been freed at the plant.

The primary organization of the scientific and technical society of the Odessa Kislorodmash Scientific Production Association, at which the increase of output without the additional consumption of metal is being ensured for the second five-year plan now, is showing a good example in the fulfillment of the assignments of the program "The Materials-Output Ratio." More than a third of the machine building enterprises of the republic have already followed its example.

Throughout the Ukraine 700 primary organizations of scientific and technical societies are taking a direct part in the organization and conducting of the All-Union Socialist Competition of Collectives of Scientific Research,

Planning and Design Organizations, Enterprises and Associations for the Successful Fulfillment of the Assignments of the National Economic Plan on the Most Important Scientific and Technical Problems. This competition was organized in conformity with the decree of the CPSU Central Committee, the USSR Council of Ministers, the All-Union Central Council of Trade Unions and the All-Union Komsomol Central Committee "On the All-Union Socialist Competition for the Successful Fulfillment and Exceeding of the Assignments of the 11th Five-Year Plan" and had an appreciable influence on the development and introduction in production of highly efficient technological processes, machines, equipment and other important objects of new machinery.

For the achievement of the highest results in the competition in accordance with the results for 1981-1983 certificates of the All-Union Central Council of Trade Unions and the USSR State Committee for Science and Technology were awarded to the collectives of about 80 scientific research, planning, technological and design organizations, enterprises and associations, while 4 main organizations were recognized as the winners of the competition and were awarded Challenge Red Banners of the CPSU Central Committee, the USSR Council of Ministers, the All-Union Central Council of Trade Unions and the All-Union Komsomol Central Committee. The collective of the Institute of Electric Welding imeni Ye. O. Paton of the USSR Academy of Sciences has twice received this honor.

But what has been achieved, naturally, cannot satisfy us, since the state plan on the development of science and technology during 1983 was not fulfilled. With respect to the Ukrainian SSR Ministry of the Coal Industry the assignments of the program "The Power Complex" on the extraction of coal from completely mechanized stopes, which are equipped with mobile hydraulically operated supports, and on the performance of mine operations by sinking machines at the operating mines, which are located in Voroshilovgrad, Kirovograd and Lvov oblasts, were not fulfilled. The measures on the elimination of the shortcomings in the organization of the work of several construction organizations of the Ukrainian SSR Ministry of Construction of Heavy Industry Enterprises and the Ukrainian SSR Ministry of Industrial Construction, particularly when building the shop of synthetic slag-forming mixtures at the Donetsk Metallurgical Plant, which was envisaged by the program "Metal," as well as the placement into operation of sugar mills in Kirovograd, Khmelnitskiy and Vinnitsa oblasts in conformity with the program "Sugar," proved to be ineffective. The problems of decreasing the materials-output ratio in capital construction are being worked on inadequately.

The extensive automation of technological processes on the basis of the use of automated machine tools, machines, devices, standardized modules, robotic complexes and computer technology is one of the main directions of the work on the acceleration of scientific and technical progress and the increase of labor productivity. The republic comprehensive goal program "Labor," which for the most part is being fulfilled, reflects the measures on the decrease of the use of manual labor. A decisive turn toward the shift of workers from manual to automated and mechanized labor has occurred in all the oblasts of the republic. The oblast councils of scientific and technical societies are performing this work in close contact with party and economic organs.

The situation is different in the sectors. The analysis of the fulfillment of the programs of the decrease of the use of manual labor in 1981-1983 showed that the annual decrease of the number of workers, who are engaged in manual labor, does not correspond to the requirements of the times. A lag has been allowed at organizations and enterprises of the Ukrainian SSR Ministry of Land Reclamation and Water Resources, the Ukrainian SSR Ministry of the Coal Industry, the Ukrainian SSR State Committee for Material and Technical Supply and the Ukrainian SSR Main Administration of the Horticulture, Viticulture and Winemaking Industry. The Ministry of Light Industry fulfilled the assignments on the decrease of the use of difficult manual labor by only 66 percent. In this sector the mechanization of warehouses and loading and unloading operations is at a very low level. Last year was also not transitional for construction workers--here the rate of mechanization is very slow. As a whole the absolute scale of the use of manual labor in the republic is still quite high.

Today we cannot build plants, which will produce products of a single type for 10-15 years. Machines, which seemed like a miracle of technology, in 20 years become ordinary or entirely obsolete. In this connection the need to change rapidly the plans of output arises. The logic of scientific and technical progress requires the changeover to versatile automated production systems. In the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" attention is directed to the need for the quickest possible launching of work on the development of such production systems. By means of such production systems it is possible to increase labor productivity by tens of times, to decrease in so doing the number of production workers to one-thirtieth to one-twentieth, to ensure the continuous (three-shift) operation of the works, to increase significantly the output-capital ratio and the equipment utilization ratio, to increase the quality of products and to achieve their great competitive ability on the world market.

Success in the development of advanced automated production systems is directly dependent on the time and quality of the development of the corresponding designs and the technological preparation of production. In spite of the fact that the army of planners and designers in machine building has increased by approximately 1.5-fold, the time of the development of objects of new equipment in practice is not decreasing. The main problem here is the low efficiency of planning and design work. This disproportion in the machine-worker ratio of the engineer and worker makes it incumbent to reject the former approach, when the main emphasis was placed on production automation. The task of developing all-union programs both on versatile automated production systems and on computer-aided design systems is posed in the mentioned decree of the CPSU Central Committee and the USSR Council of Ministers.

In recent years more than 30 computer-aided design systems and subsystems have been introduced at instrument making enterprises alone. The following example shows how effective these systems are. Whereas in case of the traditional, manual method on the average about 130 hours are spent on the designing of a single die, the use of the Avtoshtamp computer-aided design system shortens this process to 7 hours.

The organizations of scientific and technical societies, and first of all of the machine building and instrument making industries, need to take a most active part in the preparation of proposals of all ranks on the programs of work on the development of versatile automated production systems and computer-aided design systems and their use in the national economy. The republic and oblast boards of scientific and technical societies need, where this has not yet been done, to establish business contacts with the directors of coordinating councils, to acquaint themselves with the plans of work and to actively join in their implementation. All our forms, methods and means must be aimed at the fulfillment of the assignments of the most important scientific and technical programs, as they have done in Lvov and Dnepropetrovsk oblasts, in Kiev and in the republic boards of the machine building industry and ferrous metallurgy.

Of course, goal program planning is on the whole a new matter. The changeover of the economy to the intensive means of development and the acceleration of scientific and technical progress urgently require a very high level of professionalism and competence. Today the organizations of scientific and technical societies need to take part in the formulation for the next five-year plan of republic goal programs, which should reflect the latest, most effective directions of the development of science and technology.

In particular, one such program will be aimed at the development and extensive introduction of biotechnologies, to which a truly revolutionary role belongs in the obtaining of qualitatively new materials, medicinal preparations and food and fodder materials and in the development of methods of plant breeding and animal husbandry. Just the first steps have been taken in this direction in the republic. A number of scientific institutions of the Academy of Sciences, the Southern Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin and the Ukrainian SSR Ministry of Higher and Secondary Specialized Education, Ministry of Health and Ministry of the Food Industry are engaged in the development of biotechnologies.

The development and introduction of robotics and versatile automated production systems should become the goal of another most important republic program. The boards and councils of scientific and technical societies will focus their attention on the determination of the sectors and specific works, the scale of the use of robotic systems and complexes and will envisage first of all assignments on the preparation of enterprises for their introduction and use.

The automation of production, beginning with groups of machine tools, presses or equipment, lines and shops and up to the complete automation of enterprises, including the automation of design work and production control, is an enormous task, the successful accomplishment of which will make it possible in industry alone to increase labor productivity by 2- to 2.5-fold and in continuous processes to free up to 50 percent of the workers.

The scientific and technical community has to make a search for new sources of energy, methods of its conversion into electric power and means of the optimization of the balance of energy consumption and to create a scientific

reserve for the leading development of nuclear power engineering. The solution of the problems of increasing the reliability and economy of the heat systems of highly efficiency power-generating equipment should be dealt with more objectively. It is necessary to take part in the research, which is aimed at the increase of the proved reserves of coal in the Donetsk basin and the introduction of the complete mechanization and automation of production processes at the mines.

In his speech at the General Assembly of the Ukrainian SSR Academy of Sciences Member of the Politburo of the CPSU Central Committee and First Secretary of the Ukrainian CP Central Committee V. V. Shcherbitskiy noted that the further strengthening of the goal orientation and the increase of the efficiency of scientific research and development are now urgent. The increase of the scientific and technical level, the quality and the competitive ability of machines, equipment and instruments is one of the most topical tasks of both scientists and production workers. Moreover, this task is of not only especially domestic, but also great international importance.

The next problem, which today has acquired particular urgency, is the development of advanced processing methods. It would not be an exaggeration to say that precisely such processing methods are now the heart of scientific and technical progress. Their introduction in production still remains a bottleneck. There are many reasons here. For example, the inadequate study of an idea as applied to production conditions, the low level of automation. A large share of the blame rests with sectorial scientific research institutes and planning and design organizations, engineering services of departments and associations. For precisely they are called upon to be the conductors between "large-scale" science and production. The scientific and technical societies should also play a positive role here, by using their traditional and nontraditional forms of work, creative brigades, the public commission of experts, interdepartmental complexes and others.

The improvement of the work of the societies, which is connected with the implementation of the Food Program, remains a task of vital importance. Much is being done in this direction. And still the careful study of the measures implemented by the societies shows that the work on the improvement of the equipment and technology of agroindustrial production is being developed slowly. The societies are not displaying yet the proper activeness in the area of the further development of the specialization, concentration and interfarm cooperation of agricultural production, the increase of the level of domestic agricultural equipment and the development of sets of modern machines for the countryside.

The scientific and technical societies should devote more attention to the fulfillment of the recommendations of the plenum of the All-Union Central Council of Trade Unions on the holding of reviews and competitions, which are aimed at the solution of the problems of eliminating the losses of agricultural products along the entire "field--consumer" technological chain. In the accomplishment of the tasks of the Food Program the societies should establish intersectorial ties more actively for the purpose of seeking effective ways and methods of managing the agroindustrial complex. Questions of the increase of the reliability and efficiency of the operation of machine

systems, the development of fundamentally new processing methods of the resource-saving type for the industrial processing of agricultural raw materials and the decrease of losses were raised pointedly at the All-Union Economic Conference on Problems of the Agroindustrial Complex.

The organizations of the scientific and technical societies are called upon to assist the collectives of the enterprises and organizations, at which the experiment on the broadening of the rights of enterprises in planning and economic activity and on the increase of their responsibility for the results of work is being conducted. Many questions of the improvement of the management mechanism deserve close attention.

In order to cope successfully with the increasing amount and complexity of work, the boards and councils of the scientific and technical societies should constantly and purposefully improve the style and methods of their activity. The party requires of all of us greater efficiency and initiative in work, great responsibility and discipline. The fulfillment of these requirements is a necessary condition of the further increase of the role and influence of the scientific and technical societies in the solution of the most important problems of the acceleration of scientific and technical progress--the basic lever of the strengthening of the economic might of our homeland and the increase of the well-being of the Soviet people.

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